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IN
WHOLE AND BROKEN NUMBERS.
DIGESTED AFTER A
NEW METHOD;
AND CHIEFLY ADAPTED TO THE
TRADE OF IRELAND.
TO WHICH ARE ADDED,
INSTRUCTIONS
FOR
BOOK-KEEPING.
WITH
THE DIGNITY OF TRADE
IN
GREAT-BRITAIN AND IRELAND.
EXTRACTED FROM THE MERCANTILE LIBRARY; OR,
COMPLEAT ENGLISH TRADESMAN.
LIKEWISE AN APPENDIX TO ALGEBRA.

BY ELIAS VOSTER.

THE TWENTY-SECOND EDITION,
CAREFULLY COLLATED WITH THE FORMER EDITIONS.
REVISED BY DANIEL VOSTER.

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Hist. of science
Traver
11-9-23

29 Jan. 24 MW

THE

PREFACE.

ALTHOUGH *this Book be deſigned only for the Uſe of my* Scholars, *yet it will unavoidably fall into the Hands of others who are not; and ſince the Method I make uſe of differs, in ſome Reſpect, from the common Way, I think it neceſſary to ſay ſomething concerning it.*

It contains ſuch Queſtions in moſt of the Rules of Vulgar ARITHMETIC, as I have taught to my Scholars *for many Years paſt; I ſay it contains only Queſtions, with the Addition of a very few Directions about the Manner of working them: It being deſigned rather for a Maſter to teach by, than for a Scholar to learn by of himſelf: And thoſe Queſtions are placed in ſuch Order, that all that are of one Nature in their Operation, are contained in a diſtinct* Section *by themſelves, with an* Example *at the beginning of each* Section *to direct the* Learner, *and lead him on, as it were by the Hand, to the reſolution of every Queſtion in it: The Eaſe this* Method *of* Proceeding *gives, and the great Service it does, both to* MASTER *and* SCHOLAR, *I have for many Years experienced.*

I have thought it proper to place Addition *of Coin,* Weight, *&c. after* Diviſion, *becauſe, in my Opinion, it ought not to be learned until* Diviſion *is well underſtood.*

As for Reduction, *ſince it is no abſolute Rule of itſelf; but is either performed by Multiplication* (called

Reduction deſcending) *or by Diviſion* (called Reduction aſcending) *or by both; the Uſe of my Rule of* Multiplication, *ſerves inſtead of the firſt, the Uſe of my* Diviſion *inſtead of the ſecond, and my* Reduction *of* Engliſh *and* Foreign Coin, *ſerves inſtead of the laſt: For there, both* Multiplication *and* Diviſion *are made uſe of in each Queſtion.*

Some, it may be, will find fault with the great Number of Queſtions contained in each Rule; but let them conſider, that Youth do not learn ſo much by Apprehenſion as Exerciſe, which not only fixes the Rules of this Art *upon their* Memories, *but by Degrees opens their* Judgment *to conceive the* Grounds *and* Reaſons *of it: As for thoſe among them that are more apprehenſive than the Generality are, they are not obliged to work all the Queſtions contained in each* Section, *a few out of each will ſuffice.*

ELIAS VOSTER.

TABLES

OF

COIN, WEIGHT, and MEASURE.

Of COIN.

1	Pound	Makes	20	Shillings
1	Shilling		12	Pence
1	Penny		4	Farthings

Of TROY WEIGHT.

1	Pound	Makes	12	Ounces
1	Ounce		20	Penny wts.
1	Penny wt.		24	Grains.

Of AVOIR-DU-POIS WEIGHT.

1	Ton	Makes	20	Hundred
1	Hundred		4	Quarters, or 112lb.
1	Quarter		28	Pounds
1	Pound		16	Ounces
1	Ounce		16	Drams, or Drachms

Of DRY MEASURE.

2 1	*Cork* Bar. or Quarter	Makes	8	Buſhels
1	Buſhel		4	Pecks Land Meaſure
1	Peck		2	Gallons) or 5 Water
1	Gallon		2	Pottles
1	Pottle		2	Quarts
1	Quart		2	Pints

Of APOTHECARIES WEIGHT.

1	*lb.* Troy	Makes	12	Ounces
1	Ounce		8	Drams
1	Dram		3	Scruples
1	Scruple		20	Grains

Of LIQUID MEASURE.

1	Ton	Makes	4	Hhds.
1	Hhd.		63	Gallons
1	Tierce		42	Gallons
1	Gallon		2	Pottles
1	Pottle		2	Quarts
1	Quart		2	Pints

Of LONG MEASURE.

1	Mile	Makes	8	Furlongs
1	Furlong		40	Perches or Poles
1	Perch		16½	Feet
1	Fathom		6	Feet
1	Ell		3	Feet 9 Inches
1	Yard		3	Feet
1	Foot		12	Inches

1 Yard is 4 Quarters; 1 Quarter 4 Nails, or 5 Quarters an Engliſh Ell; and three Quarters make an Ell Flemiſh.

Of Time.

1 Year hath 365 Days, except a Leap-Year, which hath 366 Days, and happens every Fourth Year; one Day and Night is 24 Hours; 1 Hour 60 Minutes; 1 Minute 60 Seconds.

Thirty Days hath November,
April, June, and September;
February Twenty-eight alone,
And each of the reſt Thirty-one.

Note. Every Leap-Year, February hath Twenty-nine Days.

Explanation of Marks, and Abbreviations of Words, made Uſe of in this Book.

l.	Pounds Sterling.
s.	Shillings.
d.	Pence.
Ct.	Hundreds.
lb.	Pounds.
oz.	Ounces.
pw.	Penny-weights.
Gr.	Grains.
hhd.	Hogſhead.
gal.	Gallons.
qt.	Containing.
No.	Number
ps.	Pieces.
wt.	Weight.
pCt.	per Hundred wt.

CHAP.

C H A P. I.

Of Notation and Numeration of whole Numbers.

S E C T I.

NOTATION and NUMERATION teach how to write and value any Number compoſed of the following Characters, *viz.*

One, Two, Three, Four, Five,
1, 2, 3, 4, 5,
Six, Seven, Eight, Nine, Cypher.
6, 7, 8, 9, 0.

Altho' a Cypher ſignifieth nothing by itſelf, yet being ſet to the Right Hand of any Figure, it increaſeth its Value ten Times, and are read thus, *viz.*

Ten, Twenty, Thirty, Forty, Fifty,
10, 20, 30, 40, 50,
Sixty, Seventy, Eighty, &c.
60, 70, 80, &c.

If any two Figures are ſet together, that which ſtands to the Right Hand, ſignifieth only itſelf, but that which ſtands to the Left Hand, ſignifieth its own Value ten Times, and are read thus, *viz.*

Fourteen, Twenty-five, Seventy-eight,
14, 25, 78,
Ninety-two.
92.

If three Figures ſtand together, that to the Right Hand, ſignifieth itſelf, the Second, ten times itſelf, and the Third, one hundred Times itſelf, and are read thus, *viz.*

137	*One Hundred Thirty-ſeven,*
431	*Four Hundred Thirty-one,*
646	*Six Hundred Forty-ſix,*
875	*Eight Hundred Seventy-five.*

A Number conſiſting of 4 Figures, as 4834, is thus read; Four Thouſand Eight Hundred Thirty Four. A Number of five Figures, as 72368, is read thus; Seventy-two Thouſand Three Hundred Sixty-eight.

As for Numbers conſiſting of more Figures,
Obſerve the following Table:

1	*Unit* - - - - -	1
12	*Tens* - - - - -	10
123	*Hundreds* - - -	100
1234	*Thouſands* - - -	1000
12345	*Ten Thouſands* - -	10000
123456	*Hundred Thouſands* -	100000
1234567	*A Million* - - -	1000000
12345678	*Ten Millions* - -	10000000
123456789	*Hundred Millions* -	100000000

—— II. ——

Queſtions to exerciſe Numeration.

How do you put down the following Numbers? viz.

One Hundred and Four - - -	ANSW. 104
One Hundred Twenty-three - - - -	"
Three Hundred Seventy-five - - - -	"
Four Hundred Ninety-two - - - -	"
Five Hundred Two - - - -	"
Six Hundred Seventy-eight - - - -	"
Eight Hundred Nine - - - -	"
Nine Hundred Sixty-two - - - -	"

—— III. ——

Of Numbers conſiſting of Four Figures.

Put down, *viz.*

One Thouſand Two Hundred Thirty-five	ANSWER 1235
Two Thouſand Nine Hundred Seventy -	"
Three Thouſand Nine Hundred Eleven -	"
Seven Thouſand and Six - -	"

Eight Thouſand Seven Hundred Seven - ”
Five Thouſand Seven Hundred Forty-three ”
Nine Thouſand Thirty - - ”
One Thouſand One Hundred Eleven - ”
Two Thouſand Seven Hundred Eleven - ”

—IV.—

Of Numbers conſiſting of five Figures.

How do you put down, *viz.*

Twenty Thouſand Three Hundred Forty-five. Answ. 20345
Fifty-one Thouſand Sixty-ſeven - ”
Sixty Thouſand Four Hundred Eighty-five - - - - ”
Seventy Thouſand and Twelve - ”
Eighty Thouſand and Nine - ”
Ninety-one Thouſand Three Hundred Forty-ſeven - - ”

—V.—

Of Numbers conſiſting of ſix Figures.

Write down, *viz.*

Two Hundred Thirty-four Thouſand Five Hundred Sixty-ſeven - Answ. 234567
Three Hundred Twenty-nine Thouſand Seven Hundred Seventy-nine - ”
Seven Hundred Nine Thouſand Eight Hundred Twelve - - ”
Four Hundred Seventy-three Thouſand One Hundred One - - ”
Eight Hundred Nine Thouſand Seventeen - - - ”
Nine Hundred Eighty-ſeven Thouſand Six Hundred Fifty-four - ”

—VI.

— VI. —

Of Numbers conſiſting of ſeven Figures.

Put down, *viz.*

One Million, Two Hundred Forty-ſeven Thouſand Three Hundred Fifty-ſix ANS. 1247356
Three Millions Fifty Thouſand Seven Hundred Eight - - „
Five Millions Nine Thouſand Eight Hundred Four - - „
Nine Millions Seven Hundred Four Thouſand Ninety-three - - „
Eight Millions Five Hundred Seventy Thouſand Six Hundred Ninety-five „

— VII. —

Of Numbers conſiſting of 8 *Figures.*

Put down the following Sums, *viz.*

Ten Millions Three Hundred Ninety-ſeven Thouſand Four Hundred Fifty-ſeven - - - ANSW. 10397457
Seventy-nine Millions Two Hundred Forty Thouſand Six Hundred - „
Fifty-ſeven Millions Eight Thouſand Four Hundred Thirty-ſeven - „
Sixty-eight Millions Nine Hundred Seven Thouſand Thirty-two - - „
Forty Millions One Hundred Eleven Thouſand One Hundred One - „

Put down,

One Hundred Twenty-three Millions Four Hundred Fifty-ſix Thouſand Seven Hundred Eighty-nine -

CHAP. II.

ADDITION.

SECT. I.

ADDITION teacheth to add two or more Sums together, to make them one Total.

Add the following Sums together, viz.

236	2486	3956	4675	4674
644	2355	7943	1697	7998
457	7667	8360	4309	3975
1337				

8963	9658	7539	4268	2823
3008	5732	9731	2646	9008
5769	9601	1579	3520	6524
6843	2337	5237	6482	1218
9017	8224	9795	8204	2627
7503	5338	1795	6428	8344

4830	8769	60312	576895	9768973
2970	6978	70603	79865	8970625
3795	9689	80492	93784	6276942
3962	5432	32109	6789	9756879
9874	3070	9875	3997	0312431
8237	9010	573	985	2137540
784	2986	29	5796	5067380
7963	4568	318	4796	4832518
6474	3456	4587	3210	4839518
421	4357	64338	7826	8763649
987	2148	4828	5937	2198754
274	9803	87630	78989	0763475

— II. —

The Uſe of ADDITION.

1. How much is 1080l. 3234l. 4283l. and 2325l. together? ANSW. 10922l.

Example.

£. 1080.
3234
4283.
2325.

ANSW. £. 10922

2. A Merchant is indebted to A. 1500l. to B. 408l. to C. 1310l. to D. 50l. and to E. 1900l. I demand the whole debt? ANSW. 5168l.

3. A Merchant has received the following Sums, 100l. 315l. 317l. 10l. 172l. 513l. and 9l. I demand the total Sum? ANSW. 1536l.

4. A Merchant has bought 7 Caſks of Merchandizes, No. 1, weighed 310lb. No. 2, 420lb. No. 3, 338lb. No. 4, 335lb. No. 5, 400lb. No. 6. 412lb. and No. 7, 429lb. I demand how many pounds they weigh together? ANSW. 2644lb.

5. What is the total Weight of theſe nine Caſks of Merchandize, *viz.* No. 1, 2, 3, weighed each 350lb. No. 4, and 5, weighed each 331lb. No. 6. weighed 310lb. No. 7, 8, and 9, weighed each 342lb? ANSW. 3048lb.

6. A Merchant paid the following ſums, *viz.* 5000l. 2040l. 1320l. 1400l. and 9070l. I demand the whole Sum? ANSW. 18530l.

7. A Linen Draper ſold 10 Pieces of Cloth, the firſt contained 34 Yards, the ſecond, third, fourth and fifth, contained each 36 Yards. The ſixth, ſeventh and eighth, contained each 33 Yards, and the ninth and tenth Pieces contained each 35 Yards. How many Yards are they together? Answ. 347 Yards.

8. A Caſhier received 6 Bags of Money, the firſt holds 1034l. the ſecond 1025l. the third 2008l. the fourth 7013l. the fifth 5075l. and the laſt holds 89l. How much is the whole Sum received? Answ. 16244l.

9. A Vintner buys 6 Pipes of Brandy, containing as follow, *viz.* 120 Gallons, 118, 125, 121, 127 and 119 Gallons. How many Gallons in the whole? Answ. 730 Gallons.

10. What is the total Weight of theſe ſeven Caſks of Merchandizes, *viz.* No. 1, weighed 960lb. No. 2, 725lb. No. 3, 830lb. No. 4, 798lb. No. 5, 697lb. No. 6, 569lb. and No. 7, 987lb? Answ. 5566lb.

11. If for 1 Penny I can buy ten Eggs, how many can I buy for 40d? Answ. 400 Eggs.

12. How much is nine Times one Hundred and thirty-five? Answ. 1215.

13. A Merchant bought 3 Tons of Butter at 20l. per Ton, and 7 Tons of Tallow, at 40l. per Ton. How much doth both the Butter and Tallow come to? Answ. 340l.

14. How much is 3 Times 9, 4 Times 50, and twice 170lb? Answ. 567lb.

15. Add three Times 303, ſix Times 909, four Times 505, and five Times 202lb. Answ. 9393lb.

16. If one Ton of Merchandize coſt 39l. what will twenty Tons come to? Answ. 780l.

17. Add twice 397, three Times 794, four Times 3176, five Times 15880, ſix Times 95280, and once 333040. Answ. One Million.

18. How many days are there in a Year, allowing for the Months of April, June, September and November 30 Days each, for February 28, and the other Months each 31 Days? Answ. 365 Days.

19. What Day of the Year was the 11th Day of May 1724, it being Leap Year? Answ. The 132nd Day.

20. Anno 1715 being a common Year, I demand what Day of that Year the 22d Day of April was? Answ. The 112th Day.

CHAP. III.

MULTIPLICATION.

SECT. I.

MULTIPLICATION ſerves inſtead of many ADDITIONS, and teaches how by two Numbers given to find a third, which ſhall contain either of the given Terms ſo often as the other of them has Units.

MULTIPLICATION TABLE.

2 Times
2 are 4
3 : 6
4 : 8
5 : 10
6 : 12
7 : 14
8 : 16
9 : 18

3 Times
3 : 9
4 : 12
5 : 15
6 : 18
7 : 21
8 : 24
9 : 27

4 Times
4 : 16
5 : 20
6 : 24
7 : 28
8 : 32
9 : 36

5 Times
5 are 25
6 : 30
7 : 35
8 : 40
9 : 45

6 Times
6 : 36
7 : 42
8 : 48
9 : 54

7 Times
7 : 49
8 : 56
9 : 63

8 Times
8 : 64
9 : 72

9 Times 9 : 81

Multiply the following Sums, viz.

6298	79659	890659	7998450
by 4	5	6	7
25192			

—— II. ——

Multiply 65436
by 24

261744
130872

Answ. 1570464

Note. *To prove Multiplication, multiply half the Multiplicand by double the Multiplicator: or, half the Multiplicator, by double the Multiplicand.*

Multiply the following Sums, viz.

479865	9875978	98320064
by 36	76	94

—— III. ——

Multiply 9832064
by 324

39328256
19664128
29496192

Answ. 3185588736

Multiply the following Sums, viz.

3987547	9875496	4287219
by 716	697	574

— IV. —

Multiply 6504039
by 9804

26016156
520323120
58536351

Answ. 63765598356

Multiply the following Sums, viz.

63008795	94065439	54306704
by 986005	70408	8016069

— V. —

How much is 100 *Times* 21763?

Example.

21763
100

Answ. 2176300

Multiply the following Sums, viz.

97648	39765	78452
by 98100	725000	8790000

VI. —

VI.

THE USE OF MULTIPLICATION.

NOTE.

Of Coin.	*Pounds multiplied by* 20 *are Shillings.*
	Shillings multiplied by 12 *are Pence.*
	Pence multiplied by 4 *are Farthings.*
Of Avoir-du-pois Weight.	*Tons multiplied by* 20 *are Hundreds.*
	Hundreds multiplied by 4 *are Quarters.*
	Quarters multiplied by 28 *are Pounds.*
	Pounds multiplied by 16 *are Ounces.*
	Ounces multiplied by 16 *are Drams.*
Of Troy Weight.	*Pounds Troy multiplied by* 12 *are Ounces.*
	Ounces multiplied by 20 *are Penny Wts.*
	Penny Wts. multiplied by 24 *are Grains.*
Of Liquid Meaſure.	*Tons multiplied by* 4 *are Hhds.*
	Hhds. multiplied by 63 *are Gallons.*
	Gallons multiplied by 2 *are Pottles.*
	Pottles multiplied by 2 *are Quarts.*
	Quarts multiplied by 2 *are Pints.*
	Pints multiplied by 4 *are Noggins.*
Of Dry Meaſure.	*Barrels multiplied by* 4 *are Buſhels.*
	Buſhels multiplied by 4 *are Pecks.*
	Pecks multiplied by 2 *are Gallons.*
	Gallons multiplied by 2 *are Pottles.*
Of Time.	*Years multiplied by* 365 *are Days.*
	Days multiplied by 24 *are Hours.*
	Hours multiplied by 60 *are Minutes.*
	Minutes multiplied by 60 *are Seconds.*

Of Long Meaſure.
Miles multiplied by 8 are Furlongs.
Furlongs multiplied by 40 are Perches.
Perches multiplied by 16½ are Feet.
Feet multiplied by 12 are Inches.

Apothecaries Weight.
Ounces Troy multiplied by 8 are Drams.
Drams multiplied by 3 are Scruples.
Scruples multiplied by 20 are Grains.

1. How many Pence are in 1944 Shillings?

Example.

1944s.
12

3888
1944

Answ. 23328d.

2. How many Shillings are in 1395 Pounds? Answ. 27900 Shillings.

3. In 2480 Pence, how many Farthings? Answ. 9920 Farthings.

4. At 12 Plums a Penny, how many for Sixpence? Answ. 72.

5. How many Hours are in 365 Days? Answ. 8760 Hours.

6. In 112lb. Avoir-du-pois, how many Ounces? Answ. 1792 Ounces.

7. How much will 255 Tons of Butter come to at 25l. a Ton? Answ. 6125l.

8. If one Pound of Raiſins coſt 4 Pence, how much will 112lb coſt? Answ. 448d.

9. How many Minutes are in 24 Hours? Answ. 1440 Minutes.

10. In 1440 Minutes how many Seconds? Answ. 86400 Seconds.

11. If 3 Eggs coſt ~~a Half~~-penny, how many for one Shilling? Answ. 72 Eggs.

12. How many Pence are in 100 Cobbs, at 57d. each? Answ. 5700d.

13. In 200 Guineas of 23s. each, how many Shillings? Answ. 4600s.

14. If one Crown is 65d. how many Pence are there in 633 Crowns? Answ. 41145d.

15. How many Gallons are in 264 Hhds. at 63 Galls. per Hhd? Answ. 16632.

——VII.——

16. How many Pence are in 359l.?

Example.

```
 359l.
   20
 -----
 7180s.
   12
 -----
 14360
 7180
 -----
```

Answ. 86160d.

17. In 25 Tons of Brandy, how many Gallons? Answ. 6300.

18. How many Penny-weights are in 100lb. Troy? Answ. 24000.

19. In twenty Years how many Hours? Answ. 175200.

20. How many Pence are in 1000l.? Answ. 240000.

21. In 2896 Shillings how many Farthings? Answ. 143328.

22. How many Ounces are in 853 Ct. Avoir-du-pois Weight? Answ. 1528576.

——VIII.

VIII.

23. How many Quarts are in 70 Tons of Brandy?

70 Tons
4

280 Hhds.
63

840
1680

17640 Gal.
4

Answ. 70560 Quarts.

24. How many Minutes are in 1709 Years? Answ. 898250400 Minutes.

25. In 987l. how many Farthings? Answ. 938880 Farthings.

26. How many Grains are in 20lb. of Silver? Answ. 15200 Grains.

27. In 100 Years how many Seconds? Answ. 3153600000 Seconds.

28. How many Farthings are in 897 Guineas of 23s. each? Answ. 990288.

29. How many Feet are in one Mile? Answ. 5280.

30. How many Feet are there from Dublin to Cork, ſuppoſing their Diſtance 100 Miles? Answ. 528000 Feet.

31. How many Inches would reach round the Earth, its Circumference being 360 Degrees, and each Degree 60 Miles? Answ. 1368576000.

— IX. —

32. How many Pence are in 18s. 6d.? Answ. 222d.

s d.
18 : 6.
12

42
18

Answ. 222d.

33. How many Shillings are in 105l. 18s.? Answ. 2118s.

34. In 7l. 13s. how many Pence? Answ. 1836d.

35. How many lb. are in 75 Ct. 3 qrs.? Answ. 8484lb.

36. In 145 Ct. 2 qrs 25lb. how many lb? Answ. 16321lb.

37. In one hundred and ſeven Pounds Sterl. and eleven Pence, how many Pence? Answ. 25691d.

38. How many Gallons are there in 36 Tons, 3 Hhds. and 27 Gallons? Answ. 9288 Gallons.

39. In 46 Years, 21 Days, 8 Hours, and 59 Minutes, how many Minutes? ANSW. 24208379.

—— X. ——

40. How many Pence are in 500 Piſtoles of 18s. and 6d. each?

Example.

s. *d.*
500 at 18 : 6
222 12
——— ———
ANSW. 111000 42
18
———
222d.

41. In 609 Pieces of 3s. and 10½d. how many Halfpence? ANSW. 56637.

42. How many Halfpence are in 396 Pieces of 4s. 7½d.? ANSW. 43956.

43. If 1 Piece is 5s. 10½d. how many Halfpence are there in 896 ſuch Pieces? ANSW. 126336.

44. How many Pence are in 987 Pieces of 3s. 4d. each? ANSW. 39480.

45. In one thouſand one hundred and eleven Pieces of 3s. 10½d. How many Halfpence? ANSW. 103323.

46. How many *lb.* are in 16 Caſks, each 2 Cwt. 3qrs. 14lb.?

Example.

Ct. *qrs.* *lb.*
2 : 3 : 14
4
———
11 *qrs.*
28
———
92
23
———
322 *lb.* in one Caſk.
16
———
1932
322
———
Answ. 5152 lb.

47. In 24 Bags, each 4 Ct. 1qr. 16lb. how many lb.? Answ. 11808.

48. In 10 Bags, each 300 Crowns, and each Crown 5s. 5d. I demand how many Pence? Answ. 195000.

49. In fifty Heaps of Piſtoles, and 20 in a Heap, each Piſtole 18s. 6d. how many Pence? Answ. 222000.

50. How many Sparrows, 10 for a Penny, would pay for an Horſe worth 20l.? Answ. 48000.

CHAP. IV.

SUBTRACTION.

SUBTRACTION teacheth to take a leſs Number from a greater, and to know what remains.

From	8103	1969	1917	1540
Take	4193	1408	1718	1460
Remain	3910			
Proof	8103			

From	6119889	4090987	6278505
Take	4599207	1989849	1435040
Remain			
Proof			

From	59740167523	78000330402
Take	23420891075	53298495269
Remain		
Proof		

— II. —

Of COIN.

	l.	s.	d.	l.	s.	d.
Received	1098 :	19 :	10	979 :	15 :	11
Paid	134 :	15 :	08	200 :	19 :	11
Remain	964 :	04 :	02			
Proof	1098 :	19 :	10			

	l.	s.	d.	l.	s.	d.
Received	9975 :	02 :	03	1500 :	19 :	07
Paid	7869 :	19 :	11	985 :	18 :	09
Remain						
Proof						

	l.	s.	d.	l.	s.	d.
Received	1000 :	19 :	09½	4351 :	17 :	10½
Paid	999 :	09 :	11½	2359 :	19 :	11¾
Remain						
Proof						

	l.	s.	d.	l.	s.	d.
Received	14932 :	19 :	10	3687 :	16 :	06¼
Paid	14768 :	17 :	09½	1459 :	17 :	07¾
Remain						
Proof						

— III.

— III. —

Of AVOIR-DU-POIS WEIGHT.

	Ct. qrs. lb.	Ct. qrs. lb.
Bought	200 : 2 : 26	275 : 2 : 15
Sold	99 : 3 : 15	27 : 2 : 07
Remain	100 : 3 : 11	
Proof	200 : 2 : 26	

	Ct. qrs. lb.	Ct. qrs. lb.
Bought	6040 : 1 : 21	1937 : 3 : 00
Sold	1908 : 3 : 27	899 : 3 : 27
Remain		
Proof		

	Ct. qrs. lb.	Ct. qrs. lb.
From	8340 : 2 : 03	9074 : 3 : 25
Take	1090 : 3 : 16	7849 : 1 : 16
Reſt		
Proof		

	Tons. Ct. qrs. lb.	Tons. Ct. qrs. lb.
Bought	6904 : 16 : 3 : 11	7650 : 10 : 0 : 13
Sold	987 : 14 : 0 : 27	5879 : 10 : 3 : 25
Remain		
Proof		

— IV. —

Of LIQUID MEASURE.

	Tons. hhd. gal.	*Tons. hhd. gal.*
Bought	31 : 3 : 15	54 : 0 : 27
Sold	29 : 2 : 26	21 : 3 : 42
Reſt	02 : 0 : 52	
Proof	31 : 3 : 15	

	Tons. hhd. gal.	*Tons. hhd. gal.*
Bought	304 : 0 : 54	724 : 1 : 33
Sold	109 : 3 : 54	247 : 2 : 11
Reſt		
Proof		

— V. —

Of TROY WEIGHT.

	lb. oz. pw. gr.	*lb. oz. pw. gr.*
Bought	554 : 9 : 19 : 23	946 : 00 : 00 : 01
Sold	97 : 0 : 17 : 15	195 : 11 : 17 : 23
Reſt	457 : 9 : 02 : 08	
Proof	554 : 9 : 19 : 23	

lb.

	lb.	oz.	pw.	gr.	lb.	oz.	pw.	gr.
Bought	304	11	15	13	917	0	14	09
Sold	196	10	19	21	798	9	18	17
Reſt								
Proof								

—— VI. ——

Other Queſtions proper to this RULE, are ſuch as follow:

1. A Merchant bought 600 ſalt Ox Hides, weighing 561 Ct. 0qrs. 2lb. of which he ſells 250 Hides, weighing 239 Ct. 3qrs. 25lb. I demand how many Hides he has left, and what they weigh? ANSW. 350 Hides, weighing 321 Ct. 0qrs. 5lb.

Example.

	Hides	Ct.	qrs.	lb.
Bought	600 qt.	561	0	02
Sold	250 qt.	239	3	25
Reſt	350 qt.	321	0	05

2. A Shop-keeper bought a Piece of Cloth, qt. 42 Yards, for 22l. 10s. of which he ſells 27 Yards for 15l. 15s. I demand how many Yards he has left, and what they ſtand him in? ANSW. 15 Yards, and coſt him 6l. 15s.

3. What Number is that which being added to 9709, makes 10901? ANSW. 1192.

4. A

Merchant has 209 Caſks of Butter weigh- 0 Ct. 2 qrs. 14lb. ſhips off 173 Caſks of the said Butter, weighing 213 Ct. 2 qrs. 27lb. I demand how many Caſks he has left, and their Weight? Answ. 36 Caſks, qt. 180 Ct. 3 qrs. 15lb.

5. A Vintner bought 20 Pipes of Brandy, qt. 2459 Gallons, and ſells 14 Pipes, qt. 1680 Gallons, how many Pipes and Gallons has he unſold? Answ. 6 Pipes, qt. 779 Gallons.

6. A Merchant bought 564 tanned Hides, weighing 16800lb. ſells thereof 260 Hides, weight 7809lb. how many Hides has he unſold, and what do they weigh? Answ. 304 Hides, qt. 8991lb.

7. Suppoſe *Cork*, *Clonmel* and *Dublin* lie in a ſtraight Line, and the Diſtance between *Cork* and *Dublin* is 100 Miles, and from *Cork* to *Clonmel* is 30 Miles, I demand the Diſtance between *Clonmel* and *Dublin?* Answ. 70 Miles.

8. How long is it ſince the Revolution which happened in the Year 1688, we being now in the Year 1792? Answ. 104 Years.

9. What Time is there between the Eclipſe which happened in the Year 1715, the 22d Day of April, 30 Minutes paſt 7, in the Morning; and the Eclipſe which happened in the Year 1724, the 11th of May, at 9 Minutes paſt 5 in the Afternoon? Answ. 9 Years, 20 Days, 9 Hours, 39 Minutes.

CHAP. V.

DIVISION.

SECT. I.

DIVISION teacheth how often one Number is contained in another, or how to divide a Number into as many equal Parts as you pleaſe.

How often goes 2 into 4398? ANSW. 2199 Times.

Example.

$$\begin{array}{r} \cancel{1}\cancel{1} \\ \cancel{4}\cancel{3}\cancel{9}\cancel{8} \\ \cancel{2}\cancel{2}\cancel{2}\cancel{2} \end{array}\left\{\begin{array}{r} \\ 2199 \\ 2 \end{array}\right.$$

Proof 4398

Divide the following Sums, viz.

20830368 by 3
26029292 by 4
98763805 by 5
23343954 by 6
23343968 by 7
99800637 by 8
96783094 by 9
82045603 by 7

—— II. ——

How many Times goes 12 into 31589? ANSW. 2632 Times, and 5 over.

Example.

~~732~~(5
~~3158~~9 } 2632, and 5 over
~~12222~~ } 12
~~111~~

5269
2632

Proof 31589

Divide the following Sums, viz.

3970478 by 24	8079860 by 54
2725924 by 36	7805438 by 63
6782029 by 48	6758237 by 89
8207603 by 76	1976392 by 82

— III. —

Divide 3185588940 by 324, comes 9832064, and 204 over.

Example.

~~21~~(2
~~106205~~(0
~~16936090~~(4
~~3185588940~~ } 9832064
~~324444444~~ } 324
~~32222222~~
~~333333~~

39328260
19664128
29496194

Proof 3185588940

Divide the following Sums, viz.

87245229 by 432	9350673 by 793
36090645 by 592	2597906 by 967
33390373 by 797	9760965 by 796

6530

653096439 by 7627
269272099 by 7436
903606321 by 5996

274209370 by 69327
906790422 by 64369
490222493 by 73223

— IV. —

Divide 36754 by 100.

Example.

$\left.\begin{matrix}\cancel{3}\cancel{6}\cancel{7}(54 \\ \cancel{1}\cancel{1}\cancel{1}\cancel{0}\cancel{0}\end{matrix}\right\}$ 367, and 54 over.

Divide the following Sums, viz.

2339723 by 2000
9060392 by 3000
6904026 by 5000

3222200 by 1000
2396027 by 7000
1324902 by 9000

The Uſe of DIVISION.

Of Coin.

NOTE, *Farthings divided by* 4 *are Pence.*
Pence divided by 12 *are Shillings.*
Shillings divided by 20 *are Pounds.*

Of Troy Weight.

Grains Troy divided by 24 *are Penny Wts.*
Penny Wts. divided by 20 *are Ounces.*
Ounces divided by 12 *are Pounds.*

Of Avoir-du-pois Weight.

Drams Avoir-du-pois divided by 16 *are Ounces.*
Ounces divided by 16 *are Pounds.*
Pounds divided by 28 *are Quarters.*
Quarters divided by 4 *are Hundreds.*
Hundreds divided by 20 *are Tons.*

Of Dry Meaſure.

Pints divided by 2 *are Quarts.*
Quarts divided by 2 *are Pottles.*
Pottles divided by 2 *are Gallons.*
Gallons divided by 2 *are Pecks.*
Pecks divided by 4 *are Buſhels.*
Buſhels divided by 4 *are Barrels.*

Of Apothecaries Weight.

Grains Troy divided by 20 *are Scruples.*
Scruples divided by 3 *are Drams.*
Drams divided by 8 *are Ounces.*
Ounces divided by 12 *are Pounds.*

Of Liquid Meaſure.

Naggins divided by 4 *are Pints.*
Pints divided by 2 *are Quarts.*
Quarts divided by 2 *are Pottles.*
Pottles divided by 2 *are Gallons.*
Gallons divided by 63 *are Hogſheads.*
Hhds. divided by 4 *are Tons.*

Of Time.

Seconds divided by 60 *are Minutes.*
Minutes divided by 60 *are Hours.*
Hours divided by 24 *are Days.*
Days divided by 365 *are Years.*

1. How many Pence are in 1008 Farthings? ANSW. 252 Pence.

Example.

$$\begin{array}{r l} 2 & \\ \cancel{1}\cancel{0}\cancel{0}\cancel{8} & \left\{ 252 \right. \\ \cancel{4}\cancel{4}\cancel{4} & \end{array}$$

2. How many Shillings are in 7776 Pence? ANSW. 648 Shillings.

3. In 109080 Shillings, how many Pounds Sterling? ANSW. 5454l.

4. How many Crowns are in 12111 Pence, each Crown at 65 Pence? ANSW. 186 Crowns, and 21d.

5. In 85400 Pence, how many Ducatoons of 72d. each? ANSW. 1186 Ducatoons, and 8d. over.

6. How many Guineas of 23s. each, could one have for 1009800 Shillings? ANSW. 43904 Guineas, and 8s. over.

7. In 107520 Ounces Avoir-du-pois Weight, how many lb? Answ. 6720lb.

8. How many Pounds are in 20196 Ounces Troy Weight? Answ. 1683lb.

9. In 20658 Gallons how many Hogſheads? Answ. 327 Hogſheads, and 57 Gallons over.

10. How many Days are in 8760 Hours? Answ. 365 Days.

11. How many Cobs of 57d. each, are equal to 57000d.? Answ. 1000.

—— VI. ——

12. In 16320lb. of Beef, how many hundred Weight? Answ. 145 *Ct.* 2 *qrs.* 24*lb.*

$$\begin{array}{r} (2 \\ \cancel{2}\cancel{3}\cancel{8}(4 \\ \cancel{1}\cancel{6}\cancel{3}\cancel{2}\cancel{0} \\ \cancel{2}\cancel{8}\cancel{8}\cancel{8} \\ \cancel{2}\cancel{2} \end{array} \left\{ \begin{array}{l} \cancel{1}\cancel{2}(2 \\ \cancel{5}\cancel{8}\cancel{2} \\ \cancel{4}\cancel{4}\cancel{4} \end{array} \right\} \quad \begin{array}{ccccc} \mathit{Ct.} & & \mathit{qrs.} & & \mathit{lb.} \\ 145 & : & 2 & : & 24 \end{array}$$

13 How many Pounds Sterling are in 86248 Pence? Answ. 359l. 7s. 4d.

14. How many Tons of Wine are in 6965 Gallons? Answ. 27 Tons, 2 Hogſheads, and 35 Gallons.

15. In 340480 Ounces Avoir-du-pois, how many Hundred Weight? Answ. 190 *Ct.*

16. How many Years are in 175280 Hours? Answ. 20 Years, 3 Days, 8 Hours.

17. In 115200 Grains, how many lb. Troy Weight? Answ. 20l.

VII.

18. If 1 Yard of Cloth coſt 5s. how many Yards can I buy for 7500s.? Answ. 1500 Yards.

Example.

$$\begin{array}{r}\cancel{2}\\ \cancel{7}\cancel{5}\cancel{0}\cancel{0}\\ \cancel{5}\cancel{5}\cancel{5}\cancel{5}\end{array}\left\{\vphantom{\begin{array}{c}1\\1\\1\end{array}}\right. 1500$$

19. If 1500 Yards of Cloth coſt 7500s. what coſts one Yard? Answ. 5s.

20. How many Tons of Brandy can be bought for 2880l. at 60l. the Ton? Answ. 48 Tons.

21. If a Journeyman earns 520s. in a Year, how much is it a Week? Answ. 10s.

22. How many Hogſheads of Wine can I buy for 972l. if one Hhd. coſt 9l.? Answ. 108 Hhds.

23. If 108 Hogſheads of Wine coſt 972l. what will one Hhd. come to? Answ. 9l.

24. If in one Week I ſpend 9s. in what Time can I ſpend 468s.? Answ. In 52 Weeks.

25. How much is a Ton of Tallow worth, if 294 Tons coſt 8526l.? Answ. 29l.

VIII.

26. If 3024l. were to be divided between 5 Perſons, what would each Man's Share be? Answ. 604l. 16s.

Example.

$$\left.\begin{array}{r}(4\\ \cancel{3}\cancel{0}\cancel{2}\cancel{4}\\ \cancel{5}\cancel{5}\cancel{5}\end{array}\right\} 604\text{l. and } \begin{array}[t]{c}4\\ 20\\ \hline\end{array} \text{ over.}$$

$$\begin{array}{r}\cancel{8}\cancel{0}\\ \cancel{5}\cancel{5}\end{array}\left\{\vphantom{\begin{array}{c}1\\1\end{array}}\right. 16\text{s.}$$

27. Suppoſe 1406l. were to be divided between 8 Perſons, what would each Man's Part be? Answ. 175l. 15s.

28. Divide 622l. between 6 perſons, and it comes to 103l. 13s. 4d. for each.

29. What is each Man's Share, if 270l. were to be divided between 8 Perſons? Answ. 33l. 15s.

30. Divide 1224l. between 320 Men, and it comes to 3l. 16s. 6d. each.

31. Divide 3l. between 16 Perſons, and how much does it come to for each? Answ. 3s. 9d.

CHAP. VI.

ADDITION OF COIN.

SECT. I.

l.	s.	d.
710	11	06
612	14	03
410	15	07
1734	01	04

l.	s.	d.
516	14	09
724	17	09
319	08	06

l. *s.* *d.*
206 : 02 : 08
1090 : 02 : 08
984 : 12 : 03
442 : 13 : 09
663 : 11 : 09

l. *s.* *d.*
1234 : 03 : 01
127 : 19 : 11
371 : 14 : 03
1028 : 17 : 09
799 : 17 : 06

l. *s.* *d.*
137 : 17 : 07
193 : 10 : 11
1213 : 13 : 00
319 : 19 : 07
1000 : 04 : 11
99 : 16 : 06
118 : 09 : 09
976 : 13 : 10
549 : 12 : 06

l. *s.* *d.*
343 : 10 : 07
28 : 11 : 06
308 : 18 : 04
1008 : 11 : 04
152 : 12 : 09
383 : 13 : 07
1009 : 14 : 06
935 : 13 : 09
796 : 17 : 06

l. *s.* *d.*
999 : 18 : 01
808 : 17 : 10
777 : 18 : 01
666 : 16 : 09
555 : 15 : 08
677 : 13 : 07
333 : 12 : 06
738 : 11 : 05
313 : 10 : 01
331 : 11 : 03
113 : 17 : 01
174 : 13 : 10
751 : 12 : 09

l. *s.* *d.*
1779 : 18 : 01
808 : 19 : 11
909 : 16 : 11
1851 : 17 : 10
765 : 17 : 02
983 : 10 : 04
1899 : 11 : 05
651 : 13 : 04
1351 : 15 : 08
235 : 16 : 06
1065 : 12 : 03
932 : 13 : 02
1166 : 14 : 08

l.	s.	d.
695	19	11
876	17	09
742	10	01
967	19	10
435	14	11

l.	s.	d.
689	18	02
873	01	09
175	12	03
789	14	06
969	10	06

l.	s.	d.
875	18	06½
1020	17	08
781	12	08¾
897	18	10
1758	15	08¼
585	10	10
1679	14	10½
899	17	07
1099	16	00¾

l.	s.	d.
1007	17	07½
482	19	08
1829	17	10¾
996	15	08
2534	18	05½
724	14	04
1654	11	09¾
607	14	03
1596	14	07½

l.	s.	d.
1695	18	08
4304	17	09
3957	01	11
3169	16	02
6901	16	02
6396	10	09
9850	13	10
2069	10	06
5329	19	06
3985	04	02
6302	16	10
9108	19	09
2399	19	09
6054	12	09

l.	s.	d.
9790	17	10½
7549	18	07
9054	15	10¼
9462	09	09
9962	12	03¼
2609	10	06
3796	14	06¾
6984	15	06½
9865	07	10
7996	16	04
6923	18	06½
9562	15	11
1307	19	10¼
1399	17	11

1036821

l.	s.	d.
206	02	08
1090	02	08
984	12	03
442	13	09
663	11	09

l.	s.	d.
1234	03	01
127	19	11
371	14	03
1028	17	09
799	17	06

l.	s.	d.
137	17	07
193	10	11
1213	13	00
319	19	07
1000	04	11
99	16	06
118	09	09
976	13	10
549	12	06

l.	s.	d.
343	10	07
28	11	06
308	18	04
1008	11	04
152	12	09
383	13	07
1009	14	06
935	13	09
796	17	06

l.	s.	d.
999	18	01
808	17	10
777	18	01
666	16	09
555	15	08
677	13	07
333	12	06
738	11	05
313	10	01
331	11	03
113	17	01
174	13	10
751	12	09

l.	s.	d.
1779	18	01
808	19	11
909	16	11
1851	17	10
765	17	02
983	10	04
1899	11	05
651	13	04
1351	15	08
235	16	06
1065	12	03
932	13	02
1166	14	08

l.	s.	d.
695	19	11
876	17	09
742	10	01
967	19	10
435	14	11

l.	s.	d.
689	18	02
873	01	09
175	12	03
789	14	06
969	10	06

l.	s.	d.
875	18	06½
1020	17	08
781	12	08¾
897	18	10
1758	15	08¼
585	10	10
1679	14	10½
899	17	07
1099	16	00¾

l.	s.	d.
1007	17	07½
482	19	08
1829	17	10¼
996	15	08
2534	18	05½
724	14	04
1654	11	09¾
607	14	03
1596	14	07½

l.	s.	d.
1695	18	08
4304	17	09
3957	01	11
3169	16	02
6901	16	02
6396	10	09
9850	13	10
2069	10	06
5329	19	06
3985	04	02
6302	16	10
9108	19	09
2399	19	09
6054	12	09

l.	s.	d.
9790	17	10½
7549	18	07
9054	15	10¼
9462	09	09
9962	12	03¼
2609	10	06
3796	14	06¾
6984	15	06½
9865	07	10
7996	16	04
6923	18	06½
9562	15	11
1307	19	10¼
1399	17	11

1036821

l.	*s.*	*d.*	*l.*	*s.*	*d.*
1036821	15	11½	18101035	15	04
10920	17	04	15173260	18	03¼
1032	19	08½	17121960	14	06
50233	15	04½	1218130	18	06¼
1006	13	02	154188	13	07¾
102021	17	04¼	176099	09	11
2071099	18	10	136933	17	10¾
104	12	06¼	121966	14	05
503019	08	00¼	13083	02	07¼
50017	15	02	13666	12	08½
1188	10	03	27333	13	04
106	18	06½	17631	19	08¼
9886	17	11	23732	18	06¼
50099	03	08¼	3217	12	08
170069	18	02	13699	12	04¼
11277	17	06¾	1832999	17	02
5006	08	08¼	499	06	05¼
4117	05	04	1783	13	07
2239	03	10¼	18925	19	10½
44202	15	09	174220	09	05
3222	12	07½	832192	13	07½
172310	16	06	282	09	09¼
16230	17	03	1826	06	07
1726	15	10	32135	08	11¾
14	13	05¼	32005	09	09½
292004	18	01	1033209	16	03½

—— II. ——

By Avoir-du-pois Weight are commonly weighed Butter, Tallow, Iron, Lead, Wool, Tobacco, and all Sorts of Grocery Wares whence there may iſſue a Waſte.

Ct.	*qrs.*	*lb.*
923	2	11
316	3	25
579	2	27
421	3	19
784	1	26
234	2	09
492	1	07
944	3	19
193	2	24
619	0	14

Ct.	*qrs.*	*lb.*
184	3	22
745	2	27
943	3	25
428	0	24
109	2	23
412	1	25
145	3	20
864	0	14
419	1	18
289	1	19

Ct.	*qrs.*	*lb.*
491	2	19
642	0	04
121	1	10
945	0	16
196	2	25
694	0	10
409	2	11
189	0	14
914	2	18

Ct.	*qrs.*	*lb.*
649	1	14
464	0	09
161	2	16
914	2	04
149	0	19
946	2	17
514	0	10
495	2	24
189	1	18

Ct.	*qrs.*	*lb.*
791	3	27
801	1	27
647	3	10
109	0	19
456	1	23
990	3	18
785	1	27

Ct.	*qrs.*	*lb.*
805	3	21
805	1	18
810	0	10
167	3	24
780	2	11
456	0	19
822	2	24

Ct.	*qrs.*	*lb.*
567	0	22
345	0	17
234	2	21
621	0	25
789	3	10
908	1	16
457	0	24

Ct.	*qrs.*	*lb.*
890	0	18
802	2	22
987	3	24
893	2	10
939	3	21
456	1	25
319	0	16

Ct.	*qrs.*	*lb.*
1190	0	18
901	2	25
1367	1	26
890	0	00
1067	0	22
986	2	10
1609	3	10

Ct.	*qrs.*	*lb.*
1907	2	21
915	0	24
1567	2	26
457	0	05
1096	1	00
805	2	23
1890	0	06

Tons.	*Ct.*	*qrs.*	*lb.*
184	09	1	19
495	19	2	24
514	14	1	10
946	12	2	17
149	19	0	19
198	14	2	16
935	18	0	16

Tons.	*Ct.*	*qrs.*	*lb.*
914	18	2	18
198	16	0	14
409	19	2	18
694	13	0	19
914	14	1	24
196	09	2	25
121	19	1	10

— III. —

Of Troy Weight.

By Troy Weight are weighed Gold, Silver, Pearls, precious Stones, and Medicines.

lb.	*oz.*	*pw.*	*gr.*
898	10	15	15
834	09	13	04
284	11	07	22
439	10	10	12
646	11	08	21

lb.	*oz.*	*pw.*	*gr.*
439	09	18	20
246	11	09	09
409	08	18	04
981	11	16	13
981	11	14	14

lb.	*oz.*	*pw.*	*gr.*
109	02	02	23
943	11	03	23
184	10	13	20
784	08	10	21
579	02	11	23
943	01	11	18

lb.	*oz.*	*pw.*	*gr.*
428	09	06	22
745	11	11	12
412	10	11	22
421	03	15	23
386	10	12	22
234	02	09	20

— IV. —

Of Wine Meaſure.

Tons.	*Hhd.*	*Gal.*
31	1	09
42	3	06
84	2	36
90	0	48
62	2	08

Tons.	*Hhd.*	*Gal:*
79	1	06
28	3	09
37	1	43
72	0	11
34	3	38

— V.

— V. —

Of Cloth Meaſure.

Yds.	*Qs.*	*Na.*
43	1	02
96	0	01
74	1	00
99	1	01
87	3	02

Yds.	*Qs.*	*Na.*
96	1	00
89	3	02
75	1	03
87	0	01
28	1	02

— VI. —

Of Time.

Ys.	*Ds.*	*Hs.*	*Mi.*
81	149	19	53
90	234	23	44
43	318	16	31
19	145	07	03
51	141	06	34

Ys.	*Ds.*	*Hs.*	*Mi.*
69	192	10	54
40	345	05	06
24	176	09	40
12	145	08	14
46	329	21	23

CHAP.

CHAP. VII.

REDUCTION OF COIN.

SECT. I.

To reduce Foreign and Engliſh Coin into Pounds Sterling.

The Rule.

MULTIPLY *the given Number of Pieces by the Shillings, Pence or Halfpence, &c. that are in one Piece. Then bring the Product into Pounds Sterling by the foregoing Examples in Diviſion.*

Example.

1. How many l. Sterling are in 1567 Crowns, each 5s. 5d.? ANSW. 424l. 7s. 11d.

```
   1567  at  5s.  5d.
     65      12          1(1
  -------    --        509(1  ⎧
   7835      65      101855   ⎨ 848 | 7
  9402                12222   ⎪
  -------               111   ⎩ 424l. 7s. 11d.
  101855
```

2. In 3695 Piſtoles of 18s. 6d. each, how many l. Sterling? ANSW. 3417l. 17s. 6d.

3. How many l. are in 1260 Ducatoons of 6s. each? ANSW. 378l.

4. How many l. are in 3250 Guineas of 23s. each? ANSW. 3737l. 10s.

5. In 9056 Cobs of 4s. 9d. each, how many l.? Answ. 2150l. 16s.

6. How many l. are in 5789 Crowns of 5s. 5d. each? Answ. 1567l. 17s. 1d.

7. In 6954 Pieces of 5s. 10½d. how many l.? Answ. 2042l. 14s. 9d.

8. How many l. are in 46080 Pieces of 13d.? Answ. 2496l.

9. In 1090 Moidores of 30s. each, how many l.? Answ. 1635l.

10. How many l. are in 1000 Pieces of 6½d. each? Answ. 27l. 1s. 8d.

11. In 10960 Groats how many l. Sterling? Answ. 182l. 13s. 4d.

12. How many l. are in 1094 Crowns of 58¾d. each? Answ. 267l. 16s. 0½d.

13. In 954 Moidores of 29s. 10d. how many l.? Answ. 1423l. 1s.

14. How many l. are in 478 Piſtoles of 18s. 4d. each? Answ. 438l. 3s. 4d.

—II.—

To reduce Pounds Sterling, into Foreign and Engliſh Coin.

Rule.

Reduce the given Pounds Sterling, and the given Coin into one Name, then divide one by the other, and the Quotient is the Anſwer required.

Example.

Example.

15. A Merchant is to pay 3737l. 10s. With how many Guineas of 23s. each can he do it? Answ. 3250 Guineas.

$$\begin{array}{l} 3737\text{l. } 10\text{s.} \\ \quad\ 20 \\ \hline 74750 \end{array} \qquad \begin{array}{r} \cancel{1} \\ \left.\begin{array}{r} \cancel{5}\cancel{1} \\ \cancel{7}\cancel{4}\cancel{7}\cancel{5}\cancel{0} \\ \cancel{2}\cancel{3}\cancel{3}\cancel{3}\cancel{3} \\ \cancel{2}\cancel{2}\cancel{2} \end{array}\right\} \end{array} 3250 \text{ Guineas.}$$

16. With how many Ducatoons of 6s. each could I pay 378l.? Answ. 1260.

17. In 3417l. 17s. 6d. how many Piſtoles of 18s. 6d. each? Answ. 3695.

18. I demand how many Crowns of 5s. 5d. per Piece are equal to 1567l. 17s. 1d.? Answ. 5789.

19. With how many Cruſadoes of 3s. 2d. per Piece could I pay 1093l. 2s. 8d.? Answ. 6904.

20. A Merchant is to pay 2042l. 14s. 9d. I demand with how many Ducatoons of 5s. 10½d. can he pay it? Answ. 6954.

21. How many Pieces of 13d. are equal to 2496l.? Answ. 46080.

22. In 27l. 1s. 8d. how many Pieces of 6d½.? Answ. 1000.

23. With how many Moidores of 30s. per Piece can one pay 1635l. Answ. 1090.

24. How many Piſtoles of 18s. 6d. will be wanted to pay 162l. 17s. 6d.? Answ. 176 Piſtoles, and 1s. 6d.

25. In 1000l. how many Moidores of 29s. 10d. per Piece? Answ. 670 Moidores, and 11s. 8d.

— III. —

To reduce one Kind of Coin into another Kind of Coin.

Rule.

Bring both Coins into the ſame Denomination, and the Products divide by one another.

26. How many Crowns of 5s. 5d. per Piece are equal to 19045 Cobs of 4s. 9d. per Piece Answ. 16701.

```
        19045  of 4s. 9d.        5s. 5d.
           57     12             12
       -------    --            ----
       133315     57             65
        95225
       -------                    4
       1085565                   455
                               1085565 } 16701
                                655555
                                 6666
```

27. How many Piſtoles of 18s. 6d. per Piece, are contained in 1001 Crowns of 5s. 5d. per Piece? Answ. 293 Piſtoles, and 1s. 7d.

28. In 16701 Crowns of 5s. 5d. each, how many Cobs of 4s. 9d. each? Answ. 19045.

29. How many Crowns of 5s. 5d. each, are in 976 Piſtoles of 18s. 6d. each? Answ. 3333 Crowns, and 2s. 3d.

30. How many Guineas of 23s. per Piece are worth 1984 Moidores of 30s. each? ANSW. 2587 Guineas, and 19s.

31. In 10000 Pieces of 13d. how many Crowns of 5s. 5d. ANSW. 2000.

32. How many Crowns of 5s. 5d. are equal to 20000 Pieces of 6½d. ANSW. 2000.

33. How many Cobs of 4s. 7½d. per Piece are worth 564 Ducatoons of 5s. 10½d. per Piece? ANSW. 716 Cobs, and 2s.

34. A Merchant has a certain Quantity of Crowns of 5s. 5d. each, which he changes with a Caſhier for Guineas of 23s. per Piece, and receives of him 1000 Guineas. I demand how many Crowns the Merchant had? ANSW. 4246 Crowns, and 10d.

— IV. —

35. A Merchant receives the following different Species. I demand how many Pounds Sterling they make? *viz.*

	l.	*s.*	*d.*
467 at 5s. 5d. - - -"			
942 at 4s. 9d. - - -"			
120 at 18s. 6d. - - -"			

ANSW. £.461 : 4 : 1

36. Received of A——B——£. 582 : 14 : 8 on Account, or in Part Payment, of 500 Caſks of Butter ſold him, *viz.*

	l.	s.	d.
709 at 5s. 5d. - - -			
296 at 4s. 9d. - - -			
201 at 23s. - - -			
96½ at 18s. 6d. - -			

Answ. £. 582 : 14 : 08

37. Paid M—D— £. 534 : 19 : 10 in Part Payment of 30 Tons of Tallow bought of him, *viz.*

	l.	s.	d.
150 at 18s. 6d. - - -			
85½ at 23s. - - -			
1100 at 5s. 5d. - - -			

Answ. £. 534 : 19 : 10

38. Received of C—H— £. 411 : 17 : 11½ in full for Balance of all Accounts to this Day, *viz.*

	l.	s.	d.
50 at 5s. 10½d. - - -			
103 at 3s. 10½d. - - -			
205 at 3s. 2d. - - -			
219 at 3s. 4d. - - -			
1000 at 5s. 5d. - - -			
40½ at 18s. 6d. - - -			

Answ. £. 411 : 17 : 11½

39. Paid S—T— £. 200 : 19 : 2 in Part Payment of 300 tanned Hides bought of him, *viz.*

	l.	*s.*	*d.*
100 at 5s. 5d. - -	”		
50 at 23s. - -	”		
80 at 18s. 6d. - -	”		
70 at 6s. - -	”		
90 at 4s. 9d. - -	”		
	£.200 : 19 : 2		

40. Received of J— I— £.270 for my Bill on J— E— of London, for £.250 at 8 per Ct. *viz.*

	l.	*s.*	*d.*
100 at 23s. - -	”		
95½ at 18s. 6d. -	”		
75½ at 5s. 5d. -	”		
94 at 5s. 10½d. -	”		
300 at 1s. 1d. -	”		
2 at 23s. - -	”		
In Copper, 1s. 0½d. -	”		
	£.270 : 0 : 0		

41. Paid G— F— £.261 : 5 : 4½d. in part of 1500 Stone of Wool bought of him, *viz.*

	l.	*s.*	*d.*
300 at 5s. 5d. - -	”		
100 at 6s. - -	”		
150½ at 18s. 6d. -	”		
199½ at 1s. 1d. -	”		
	£.261 : 5 : 4½		

42. Paid P— P— on Account of 100 Kilderkins of Wheat bought of him, *viz.*

	l.	s.	d.
931½ at 5s. 5d. - - -”			
314½ at 4s. 9d. - - -”			
72½ at 30s. - - -”			
94 at 29s. 10d. - - -”			
27½ at 18s. 6d. - - -”			
30 at 18s. 2d. - - -”			
27 at 6½d. - - -”			
	£.629 : 7 : 2½		

43. Received of R— F— by Order, and for Account of S— S—, *viz.*

	l.	s.	d.
1036½ at 13d. - - -”			
931 at 3s. 4d. - - -”			
97 at 29s. 8d. - - -”			
104 at 29s. 6d. - -”			
58 at 18s. 4d. - - -”			
275½ at 18s. 6d. - - -”			
431½ at 23s. - - - -”			
57½ at 30s. - - -”			
	£. 1399 : 1 : 5½		

44. Paid B— B— in full of all Accounts, *viz.*

	l.	s.	d.
100 at 29s. 10d. - - -”			
256 at 29s. 8d. - - -”			
75 at 18s. 4d. - - -”			
159 at 18s. 2d. - - -”			
2036½ at 5s. 5d. - - -”			
457½ at 6s. - - -”			
694½ at 4s. 9d. - - -”			
96 at 4s. 7½d. - - -”			
103 at 5s. 10½d. - - -”			
	£. 1648 : 5 : 6½		

45. Paid W— H— for my Caſh Note, (No. 129) taken up, viz.

	l.	*s.*	*d.*
23 at 80s.	”		
13 at 79s. 8d.	”		
36 at 79s. 10d.	”		
24 at 79s. 6d.	”		
29 at 40s.	”		
16 at 39s. 10d.	”		
19 at 39s. 8d.	”		
11 at 39s. 6d.	”		
39 at 20s.	”		
27 at 19s. 10d.	”		
25 at 19s. 8d.	”		
20 at 30s.	”		
10 at 29s. 10d.	”		
14 at 29s. 8d.	”		
7 at 29s. 6d.	”		
5 at 23s.	”		
17 at 15s.	”		
4 at 14s. 8d.	”		
7 at 10s.	”		
3 at 9s. 10d.	”		
2 at 9s. 8d.	”		
5 at 9s. 3d.	”		
3 at 11s. 6d.	”		
19 at 5s.	”		
26½ at 5s. 5d.	”		
32 at 5s. 6d.	”		
	£. 750	13	3½

46. Received of J— D— 327l. for my Bill for 300l. Engliſh, which I have drawn on C—B— for his account at 9 per Ct. *viz.*

		l.	*s.*	*d.*
13 at 77s. 8d.	- - ”			
25 at 77s. 6d.	- - - ”			
14 at 38s. 10d.	- - ”			
29 at 19s. 6d.	- - - ”			
27 at 19s. 4d.	- - - ”			
20 at 22s. 9d.	- - - ”			
7 at 29s. 3d.	- - - ”			
9 at 29s. 1d.	- - - ”			
16 at 28s. 11d.	- - - ”			
26 at 18s. 3d.	- - - ”			
1 at 22s. 9d.	- - - ”			
3 at 9s. 10d.	- - - ”			
2 at 9s. 8d.	- - - ”			
1 at 9s. 2d.	- - - ”			
1 at 9s.	- - - ”			
2 at 4s. 11d.	- - ”			
1 at 4s. 9d.	- - ”			
		£.327	1	4
Returned	- - - -		1	4
		£.327	0	0

CHAP.

CHAP. VIII.

THE RULE OF THREE DIRECT.

SECT. I.

THE Rule of Three teacheth by three Numbers given to find out a fourth, which ſhall bear ſuch Proportion to the Second, as the Third doth to the Firſt.

Rule.

In ſtating the Queſtion, your firſt and third Numbers muſt be of one Name, and if they are not ſo, reduce them to it. If the middle Number (which always differs in Name from the Third) has more than one Denomination, reduce it to the loweſt mentioned. Then multiply the ſecond and third numbers together, and the Produce divide by the firſt Number, the Quotient of that Diviſion will be the Anſwer, in the ſame Name as the middle Number was reduced to.

Note. 1. *The firſt Number is always known by the Word* if, *or* at, *and the third Number is known by the Words,* how much, *or* what will.

Note. 2. *When the firſt Number is an Unit, the Anſwer is found by Multiplication only. When the ſecond or third Number is an Unit, the Anſwer will be found by Diviſion only.*

1. If one Yard of Cloth coſt 4s. what will 25 Yards coſt? ANSW. 5l.

Example.

Yd. *s.* *Yds.*
1 —— 4 —— 25
4
10 | 0

Answ. 5l.

2. If 1 lb of Sugar coſt 8d. what will 112 lb. come to? Answ. 3l. 14s. 8d.

3. What will 17 Tons of Tallow come to, at 25l. the Ton? Answ. 425l.

4. If one Piece of Silk coſt 27l. how much will 50 Pieces coſt? Answ. 1350l.

5. If one earns 10 Shillings a Week, what will it come to in 52 Weeks? Answ. 26l.

6. What will 215 Ct. of Madder coſt at the Rate of 50s. per Ct.? Answ. 537l. 10s.

7. At 6s. the Barrel of Barley, what will 139 Barrels come to? Answ. 41l. 14s.

8. What will 1050 lb. of Merchandizes come to at 19d. the lb.? Answ. 83l. 2s. 6d.

9. If one Pound of Raiſins coſt 9 Farthings, what will 112l. coſt? Answ. 1l. 1s.

10. If one ſpends 6 Pence a Day, what doth it amount to in one Year of 365 Days? Answ. 9l. 2s. 6d.

11. How much will 112 lb. of Indigo come to at the Rate of 5s. the lb.? Answ. 28l.

12. At 7s. the Gallon of Brandy, what will a Hhd. come to? ANSW. 22l. 1s.

—— II. ——

13. If one lb. of Indigo coſt 5s. 6d. what will one one Hundred Weight coſt? ANSW. 30l. 16s.

Example.

```
lb.          s.    d.            lb.
1 —————————— 5  :  6 ——————————— 112
             12                  66
           ————               ————————
             66                  672
                                672
                              ————————
                                7392
                              ————————

272  )
7392 } 61 | 6
2222 ) ————————
22     30l. 16s.
```

14. How much will 7 Tons of Butter come to at 18l. 10s. per Ton? ANSW. 129l. 10s.

15. At 18s. 6d. the Ct. what will 120 Ct. come to? ANSW. 111l.

16. If one Barrel of Barley coſt 6s. 7d. what will 100 Barrels come to? ANSW. 3[illegible]. 18s. 4d.

17. What will 112lb. of Sugar come to at 7½d. per lb.? ANSW. 3l. 10s.

18. If one Hundred of Merchandizes coſt 18s. 8d. how much will 314 Ct. come to? ANSW. 293l. 1s. 4d.

19. At 3¼d. the lb. what will 112lb. come to? Answ. 1l. 10s. 4d.

—— III. ——

20. If one Ounce of Spice coſt 2 Shillings, what will 112lb. coſt? Answ. 179l. 4s.

Example.

```
oz.        s.        lb.
1————————2————————112
                   16
                 ————
                 1792 oz.
                    2
                 ————
                 358|4
                 ————
              £.179 : 4
```

21. At 12 Shillings the Yard, how much will 10 Pieces of Cloth come to, every Piece 42 Yards? Answ. 252l.

22. What will 31 Tons of Wine come to, at 9l. per Hhd.? Answ. 1116l.

23. If a Gallon of Oil coſt 8s. how much will 10 Pipes comes to [illegible]ach Pipe 120 Gallons? Answ. 480l.

24. How much will 59 Barrels of Oats come to at 3 Pence the Peck? Answ. 11l. 16s.

25. If one Gallon of Brandy coſt 5s. how much will 8 Hhds. come to? Answ. 126l.

26. At 9 Pence the lb. what will 9 Caſks of Merchandizes come to, each weighing 40lb.? ANSW. 13l. 10s.

27. What will 3 Caſks of Merchandizes come to, each weighing 2 Hundred Weight, and at 7d. the lb.? ANSW. 19l. 12s.

—— IV. ——

28. If one Yard of Stuff coſt 17 Pence, what will 3 Pieces and 10 Yards come to, each Piece 42 Yards?. ANSW. 9l. 12s. 8d.

Example.

```
Yd.          d.             Ps.  Yds.
1 ————————— 17 ——————————— 3  :  10
                           42
                          ----
                          136
                           17
                          ----
                          952
                         136
                         ----
                         2312
213(8  {
2312   {  19 | 2
1222   { ————————————
  11      9l. 12s. 8d.
```

29. What would 224lb. 6 oz. of Spice come to, at the Rate of 3s. the oz.? ANSW. 538l. 10s.

30. If one Peck of Oats coſt 4d. what will 20 Barrels and 6 Pecks coſt? Answ. 5l. 8s. 8d.

31. How much will 12lb. 10oz. of Silver come to, at 5s. per oz.? Answ. 38l. 10s.

32. What will 156 Ct. 2 qrs. of Merchandizes come to, at the Rate of 7d. per lb.? Answ. 511l. 4s. 8d.

33. If one Gallon of Brandy coſt 4s. what will 12 Hhds. and 36 Gallons come to? Answ. 158l. 8s.

34. What muſt I pay for 15 Tons and 6 Ct. of Butter, at the Rate of 23s. per Ct.? Answ. 351l. 18s.

— V. —

35. If one Ounce of Spice coſt 3s. 4d. what will 18lb. 10 oz. coſt? Answ. 49l. 13s. 4d.

Example.

```
oz.        s.   d.        lb.   oz.
1 ———————— 3 :  4         18  :  10
          12              16
         ———             ———
          40             108
214(4 ⎧                   19
11920 ⎨ 99 | 3           ———
2222  ⎩ ———————          298
22      49l. 13s. 4d.     40
                         ————
                         11920
```

36. If 1 lb. of Tea coſt 11s. 9d. what will 4 Ct. 3qrs. come to? Answ. 312l. 11s.

37. I demand the amount of 50 Pieces and 10 Yards of Cloth, at the Rate of 4s. 9d. per Yard, each Piece containing 20 Yards? Answ. 239l. 17s. 6d.

38. What will 76Ct. 0qrs. 8lb. of Coffee come to, at 2s. 6d. the lb.? Answ. 1065l.

39. If one Pound of any Thing coſt 1s. 9d. how much will 7Ct. 2qrs. 26lb. come to? Answ. 75l. 15s. 6d.

40. At 10l. 10s. the Hhd. of Wine, what will 25 Tons and 3 Hhds. coſt? Answ. 1081l. 10s.

41. What will 150 tanned Hides come to, weighing 39Ct. 3qrs. [illegible] 6¼d. per lb.? Answ. 115l. [illegible]d.

[illegible] Yl. —

42. If one Ton of Wine coſt 42l. what will 25 Tons 2 Hhds. coſt? Answ. 1071l.

Example.

```
Ton      l.        Tons. Hhds.
 1 ———— 42 ———————— 25 : 2
 4                   4
                   ————
                   102 Hhds.
                    42
                  ——————
                   204
                  408
                  ——————
                  4284 { 1071l.
                  4444 {
```

43. At 14s. 4d. the Ct. of Cheeſe, what will 12 Ct. 2qrs come to? Answ. 8l. 19s. 2d.

44. How much will 17Ct. 2qrs. of Butter come to, at 19s. 10d. per Ct.? Answ. 17l. 7s. 1d.

45. If one Shilling gains 3d. what will 56s. 8d. gain? Answ. 14s. 2d.

46. What is the Amount of 760 Stone and 8lb. of Wool, at the Rate of 11s. 6d. per Stone? Answ. 437l. 5s. 9d.

47. What muſt I pay for 48 Tons, 3 Hhds. of Wine, if 1 Ton coſt 44l.? Answ. 2145l.

—— VII. ——

48. If in 5 Days I ſpend 1l. what will that amount to in a Year of 365 Days? Answ. 73l.

Example.

Ds. *l.* *x*
5 —— 1 —— 365 {73l.

49. If one Ton of Tallow coſt 27l. how many Tons can I have for 1350l.? Answ. 50 Tons.

50. How many Oranges can I have for 100 Crowns, at 2 Crowns per Hundred, each Hundred 6 Score? Answ. 6000.

51. If 5 Apples coſt 1 Penny, what would 1000 Apples coſt? Answ. 16s. 8d.

52. How many Herrings can I have for 1 Penny, if 1000 Herrings coſt 16s. 8d.? Answ. 5 Herrings.

—— VIII.

—— VIII. ——

53. If one Hundred of Butter coſt 25 Shillings, how many Hundred can I have for 162l. 10s.? Answ. 130 Ct.

Example.

s. *Ct.* *l.* *s.*
25 —— 1 —— 162 : 10
20

7
3250
2555 } 130 *Ct.*
22

54. At 15s. per Ct. how many Ct. can I have for 615l. 15s.? Answ. 821 Ct.

55. If one Peck of Barley coſt 9d. how many Barrels can I buy for 153l. 18s.? Answ. 256 Barrels and 8 Pecks.

56. How many lb. of Spice can I have for 216l. 18s. if 1 oz. coſt 3s.? Answ. 90lb. 6 oz.

57. What Quantity of Tallow can be bought for 121l. 10s. at the Rate of 18s. per Ct.? Answ. 135Ct.

58. If 1 lb. of Pepper coſt 17½d. how many Ct. can I have for 77l. 8s. 9d.? Answ. 9 Ct. 1qr. 26lb.

—— IX. ——

59. If 1 Ton of Butter coſt 24l. how many Tons can I buy for 180l.? Answ. 7 Tons 10Ct.

Example.

l. *Ton.* 12 Tons

24———1———$\cancel{2}\cancel{8}\cancel{0}$ 7 and 12 over.

$\cancel{2}\cancel{4}$ 20

$\cancel{2}\cancel{4}\cancel{0}$

$\cancel{2}\cancel{4}\cancel{4}$ 10 Ct. 240

$\cancel{2}$

60. How much will 159 Yards of Ratteen come to, if for 6 Yards I pay 20s? ANSW. 26l. 10s.

61. If one Ton of Wine coſt 28l. what Quantity can I have for 301l.? ANSW. 10 Tons 3 Hhds.

62 What will 5 Pieces of Stuff come to, if for 16 Yards I pay 1l. each Piece containing 41 Yards? ANSW. 12l. 16s. 3d.

63. How much Butter can be bought for 121l. 12s. at the Rate of 28s. per Ct.? ANSW. 86 Ct. 3qrs. 12lb.

64. If one Ton of Brandy coſt 40l. 12s. what Quantity can be bought for 720l. 13s.? ANSW. 17 Tons 3 Hhds.

65. If one lb. of any thing coſt 3s. 4d. how many lb. can I have for 160l. 15s. 10d.? ANSW. 964 lb. 12 oz. or 8 Ct. 2 qrs. 12 lb. 12 oz.

—— X. ——

66. If 7lb. of Madder coſt 42d. what will 1lb. coſt? ANSW. 6d.

Example.

lb. *d.* *lb.*

7———$\cancel{4}\cancel{2}$———1 comes 6d.

67. If 25 Tons of Butter coſt 450l. what will one Ton be worth? Answ. 18l.

68. What will 1 Hhd. of Wine be worth, if 105 Hhds. coſt 1155l.? Answ. 11l.

69. If in 52 Weeks I earn 156l. how much is that in one Week? Answ. 3l.

70. Suppoſe 150 Men were provided with 9000lb. of Bread for two Months, I demand each Man's Share? Answ. 60lb.

—— XI. ——

71. If 1 Ct. of Butter coſt 18s. 8d. what is 1lb. worth? Answ. 2d.

Example.

$$\begin{array}{ccccc} lb. & & s. & d. & lb. \\ 112 & \text{———} & 18 : & 8 \text{———} & 1 \\ & & 12 & & \\ \hline & & \begin{array}{c}\cancel{224}\\ \cancel{112}\end{array}\left\{ \text{2d,} \right. & & \end{array}$$

72. If 101 ſalt Ox Hides weigh 75 Ct. 3qrs. what do they weigh a Piece one with another? Answ. 84lb.

73. What will 1 Hhd. of Wine coſt, if 15 Hhds. coſt 162l. 10s.? Answ. 10l. 16s. 8d.

74. At 23s. 4d. per Ct. what is it a lb.? Answ. 2½d.

75. What will 1lb. coſt at the Rate of 46s. 8d. per Ct.? Answ. 5d.

76. Suppoſe 305 tanned Hides weigh 76 Ct. 1 qr. what do they weigh a Piece one with another? Answ. 28lb.

77. If one Ct. coſt 32s. 8d. what is it a lb.? Answ. 3½d.

—— XII. ——

78. If 45 Ct. of Merchandizes coſt 60l. 11s. 3d. what is one Ct. worth? Answ. 1l. 6s. 11d.

Example.

```
Ct.            l.    s.    d.         Ct.
45 ———————— 60  :  11  :  3 ———————— 1
               20
            ———————
             1211
               12
          ————————— }  8(11      {  2 | 6
          14535     {  323       { ——————————
           4355     {  122       {  1l. 6s. 11d.
             44     }  1
```

79. What will 1 Ton of Merchandizes ſtand me in, if for 13 Tons I pay 241l. 1s. 11d.? Answ. 18l. 10s. 11d.

80 If 284lb. of any Thing coſt 22l. 3s. 9d. what coſts 1lb.? Answ. 1s. 6¾d.

81. What will 1 Ct. of Butter be worth, if 500 Ct coſt 525l. 10s. 5d.? Answ. 1l. 1s. 0¼d.

82. If 365lb. of Indigo coſt 99l. 11s. 0¾d. what is 1lb. worth? Answ. 5s. 4¾d.

83. What will one Yard of Canvas coſt, if for 5790 Yards I pay 88l. 18s. 1½d.? Answ. 3¾d.

84. If 301 Barrels of Beef coſt 302l. 5s. 1d. what coſts 1 Barrel? Answ. 1l. 0s. 1d.

—— XIII ——

85. If 10 Pieces of Cloth (every Piece 42 Yards) coſt 126l. what will 1 Yard coſt? Answ. 6s.

Example.

Ps. *l.* *Yd.*
10——126——1
42 20
420 2520
Answ. 6s.

86. If 575 Hundred of Herrings, of 6 Score to the Hundred, coſt 25 Guineas of 23s. each, how many is that for 1s.? Answ. 120.

87. If 10 Tons of Brandy coſt 680l. what will one Hhd. ſtand in? Answ. 17l.

88. What is 1 Ct. of Butter worth, if 5 Tons coſt 130l.? Answ. 26s.

89. If 5 Hhds of Brandy coſt 84l. what is that a Gallon? Answ. 5s. 4d.

90. If 2 Pipes of Oil, qt. 240 Gallons, coſt 36l. what is 1 Quart worth? Answ. 9d.

—— XIV ——

91. If 6lb. 6 oz. of Avoir-du-pois wt. coſt 4l. 5s. what will 1 oz. coſt? Answ. 10d.

Example.

$$\begin{array}{rcrcrcrcr}
lb. & & oz. & & l. & & s. & & oz. \\
6 & : & 6 & \text{————} & 4 & : & 5 & \text{————} & 1 \\
\underline{16} & & & & \underline{20} & & & & \\
\cancel{1}\cancel{0}\cancel{2} & & & & 85 & & & & \\
 & & & & \underline{12} & & & & \\
 & & & & \underline{\cancel{1}\cancel{0}\cancel{2}\cancel{0}} & & & &
\end{array}$$

ANSW. 10d.

92. What will 1 Hhd. coſt, if for 12 Tons 3 Hhds. I pay 459l.? ANSW. 9l.

93. If 27 Ct. 2qrs. of Merchandizes coſt 341l. what is 1qr. worth? ANSW. 3l. 2s.

94. If 3 Pieces and 10 Yards of Cloth (each Piece 42 Yards) coſt 115l. 12s. what coſts 1 Yard? ANSW. 17s.

95. What is 1lb. of Butter worth, if for 429 Ct. 0qrs. 24lb. I pay 650l. 19s. 6d.? ANSW. 3¼d.

96. If 17 Tons 2 Hhds of Wine coſt 896l. 17s. 6d. what is that a Hhd.? ANSW. 12l. 16s. 3d.

—XV.—

97. A Merchant buys 2 Hhds. of Madder, wt. 17 Ct. 2qrs. for 52l. 10s. I demand what 1 Ct. coſts? ANSW. 3l.

Example.

```
Ct.  qrs.       l.    s.      Ct.
17 : 2 ——————— 52 : 10 ——————— 1
 4              20             4
————           ————
 70            1050
                  4
               ————
               4200 } 6 | 0
                770 } ——————
              Answ.. 3l.
```

98. If 7 Tons 2 Hhds. of Brandy coſt 360l. what is 1 Ton worth? Answ. 48l.

99. What will 1 lb. of Spice coſt, if 7 lb. 8 oz. coſt 4l. 5s.? Answ. 11s. 4d.

100. If 112l. 15s. gain 22l. 11s. what will 1l. gain? Answ. 4s.

101. What will 1 Ct. of Butter come to, if for 33 Ct. 1 qr. 22 lb. I pay 46l. 16s. 6d.? Answ. 28s.

102. If 67 Hhds. and 9 Gallons of Brandy coſt me 634l. 10s. what doth 1 Hhd. coſt? Answ. 9l. 9s.

103. If 203 Tons 9 Ct. 3 qrs. 3 lb. of Tallow ſtand me in 4558l. 3s. what doth one Ton coſt? Answ. 22l. 8s.

—— XVI. ——

104. If 14 lb. of Sugar are ſold for 13s. at what Rate is that the Ct.? Answ. 5l. 4s.

Example.

lb. *ſ.* *lb.*
14—13—112
13
336
112
~~1456~~ { 10(4
~~1444~~ { 5l. 4s.
~~11~~

Or thus,

lb. *ſ.* *lb.*
~~14~~—13—~~112~~
8
13
10 | 4
5l. 4s.

105. If 5 Yards of Cloth coſt 35s. what will 3 Yards coſt? Answ. 21s.

106. What Quantity of Raiſins can I have for 63d. if 7lb. coſt 21d.? Answ. 21lb.

107. If 7lb. of Sugar coſt 5s. how many Ct. can I have for 127l.? Answ. 31Ct. 3qrs.

108. What Quantity of Figs can I have for 21d. if 21lb. coſt 63d.? Answ. 7lb.

—— XVII. ——

109. If in 365 Days I ſpend 18l. 5s. how much is that a Week? Answ. 7s.

Example.

ds. *l.* *ſ.* *ds.*
365—18 : 5—7
20
365
7
~~2555~~ { 7s. Answ.
~~365~~

Or thus.

ds. *l.* *ſ.* *ds.*
365—18 : 5—7
20
~~365~~
Answ. 7s.

110. If 840lb. coſt 10l. 10s. what will 35lb. coſt? Answ. 8s. 9d.

111. What will 112lb. ſtand in, if 7lb. are worth 1s. 2d.? Answ. 18s. 8d.

112. If 112lb. of Currants coſt 1l. 12s. 8d. what will 7lb. come to? Answ. 2s. 0½d.

113. What will 25lb. of any Thing come to, at the Rate of 9l. 6s. 8d. the 100lb.? Answ. 2l. 6s. 8d.

114. How much will 84lb. of Merchandizes coſt, if 1 Ct. coſt 1l. 7s.? Answ. 1l. 0s. 3d.

115. How much beef can I buy for 100l. if 802Ct. 1qr. 17lb. coſt 650l.? Answ. 123Ct. 1qr. 22lb.

—— XVIII. ——

116. If 9 Tons of Wine coſt 72l. how many Tons can I have for 100l.? Answ. 12 Tons, 2 Hhds.

Example.

l. *Tons.* *l.*
72——9——100
9
—— } *Tons.*
$\cancel{900}$ } 12 and 36 over.
$\cancel{722}$ }
$\cancel{7}$ }
4
—— } *Hhds.*
$\cancel{144}$ } 2
$\cancel{72}$ }

Or Thus,

l. *Tons.* *l.* *Tons.*
$\cancel{72}$———9———$\cancel{100}$ } 12 and 4 over.
8 $\cancel{88}$
4
——
$\cancel{16}$ } 2 *Hhds.*
$\cancel{8}$

Or Thus,

l. *Tons.* *l.* $\cancel{12}$
$\cancel{72}$———9———$\cancel{100}$ } $\cancel{50}$ } 12 Tons 2 Hhds.
2 4 $\cancel{22}$ $\cancel{44}$
——
$\cancel{16}$

117. What will 6500lb. come to, if 5600lb. coſt 735l.? Answ. 853l. 2s. 6d.

118. How many Tons of Brandy can I buy for 2133l. if 12 Tons coſt 1296l.? Answ. 19 Tons, 3 Hhds.

119. If 60Ct. of Hops coſt 320l. what Quantity can I have for 4601l.? Answ. 862Ct. 2qrs. 21lb.

XIX

120. If 3 Hhds. of Brandy coſt 68l. 17s. what will 7 Gallons be worth? Answ. 2l. 11s.

Example.
Hhds. l. s. Gal.
3—68 : 17—7
63 20
—— ——
189 1377
7
————
$\cancel{18}$
$\cancel{9639}$ } 5 | 1
$\cancel{1899}$
$\cancel{18}$ 2l. 11s.

Or Thus,
Hhds. l. s. Gal.
3—68 : 17—7
$\cancel{63}$ 20
9 ——
——$\cancel{1377}$ } 5 | 1
27 $\cancel{277}$ ——
$\cancel{2}$ 2l. 11s.

121. A Merchant bought 14 Caſks of Indigo, Wt. 8 Ct. for 313l. 12s. I demand what 7lb. are worth? Answ. 2l. 9s.

122. If 10Ct. of Merchandizes coſt 384 Crowns of 5s. 5d. each, what will 14lb. come to? Answ. 26s.

123. What will 4 Yards of Cloth coſt, if 19 Pieces (each Piece 35 Yards) coſt 280 Cobs, each Cob at 4s. 9d.? Answ. 8s.

124. If 2 Pipes of Oil coſt 82l. 10s. each Pipe 120 Gallons, what will 1 Jar, containing 20 Gallons, coſt? Answ. 6l. 17s. 6d.

125. What will a Quarter of an Hundred of Coffee come to, if 3 Bales containing 10 Ct. coſt 143l. 16s. 8d.? Answ. 3l. 11s. 11d.

—— XX. ——

126. If for 1s. 6d. I can buy 7lb. of Raiſins, what Quantity can I buy for 605l. 11s.? Answ. 504Ct. 2qrs. 14lb.

Example.

```
                  s.  d.         lb.        l.    s.
                  1 : 6 ———————— 7 ———————— 605 : 11
                 12                          20
                 ——                        ————————
                 18                         12111
                                               12
                                           ————————
     1        (1                 Ct. qr. lb.  145332
  111934    22(4    1(2                            7
  1017324 { 56518 } 2018 { 504 : 2 : 14    ————————
  188888    28888   444                    1017324
   1111      222
```

127. If 9s. 6d. gain 5d. what will 198 Guineas 10s. 9d. gain, each Guinea at 23s.? Answ. 10l. 0s. 2½d.

128. How many Tons Wt. of Merchandizes can I have for 900l. 8s. 5¼d. if 7 Tons coſt 285l.? Answ. 22 Tons, 2 Ct. 1qr. 7lb.

129. If for 32s. 8d. I buy 28lb. of Galls, what Quantity can I have for 88l. 13s. 4d.? Answ. 13Ct. 2qrs. 8lb.

130. What will 343l, 14s. 8d. gain, If 2l. 13s. 8½d. gain 16s.? Answ. 102l. 8s.

131. If 1 Ct. 2qrs. of Butter coſt 28s. what will 256 Ct. 3qrs. 14lb. come to? Answ. 239l. 15s.

—— XXI. ——

132. If for 607l. 10s. I buy 69 Ct. 0qrs. 21lb. of Merchandizes, what Quantity can I have for 176 Guineas, and 2s.; each Guinea at 23s.? Answ. 23Ct. 0qrs. 7lb.

Example.

```
 l.     s.          Ct. qr. lb.              gs.   s.
607 : 10——————————69 : 0 : 21——————————176 : 2
 20                112                    23
————              ————                  ————
12150              7749                  4050
                   4050
                  ——————
                      |    (7 ( 1 ) Ct.  qr.  lb.
          31383450    |  2583 { 92 } 23 : 0 : 7
          1215   0    |    28 ( 44 )
```

133. If for 176 Guineas and 2s. each Guinea at 23s. I can buy 23Ct. 0qrs. 7lb. of Merchandizes, what Quantity can I have for 607l. 10s.? Answ. 69Ct. 0qrs. 21lb.

134. What will 112 Ct. 3qrs. 23lb. of Butter come to, if 95Ct. 0qrs. 20lb. coſt 88l. 16s. 8d.? Answ. 105l. 8s. 6d.

135. If 1 qr. 14 lb. of Merchandizes coſt 2l. 15s. 9d. what will 50 Ct. 3qrs. 24lb. come to? Answ. 378l. 16s. $8\frac{2}{7}$d.

136. If 100lb. of any thing coſt 25l. 6s. 3d. what will 625lb. coſt? Answ. 158l. 4s. $0\frac{3}{4}$d.

137. What will 25Ct. 0qrs. 20lb. coſt, if 112Ct. 3qrs. 23lb. coſt 105l. 8s. 6d.? Answ. [redacted] 46.5/6

XXII.

138. If 1 lb. of Spice coſt 10s. 8d. what is half an Ounce worth? Answ. 4d.

Example.

```
lb.          s.   d.         oz.
1 ————————— 10 : 8 ————————— 1/2
32          12
       ———————
           128 } 4d.
            32 }
```

139. What will 1lb. of Spice coſt, if half an Ounce coſt 4d.? Answ. 10s. 8d.

140. If for 10s. 8d. I have 1lb. of Spice, what Quantity can I have for 4d.? Answ. $\frac{1}{2}$ oz.

141. If for $26\frac{1}{4}$d. I have $10\frac{1}{2}$ oz. what Quantity can I have for 8s. 4d.? Answ. 2lb. 8 oz.

142. If for 8s. 4d. I have 2lb 8 oz. what Quantity can I have for $26\frac{1}{4}$d.? Answ. $10\frac{1}{2}$ oz.

143. What will 10½ oz. coſt, if 2lb. 8 oz. coſt 8s. 4d.? Answ. 26¼d.

144. At 18s. 8d. the Ct. what will ¾ of a lb. come to? Answ. 1½d.

145. If 1 Ct. coſt 9s. 4d. what will ½lb. coſt? Answ. ½d.

146. If 1lb. of ſpice coſt 3l. 12s. what will 6¾ Ounces come to? Answ. 1l. 10s. 4½d.

147. If 1 Ct. of Merchandizes coſt 21s. what wil[illegible]and in? Answ. 2¼d.

148. At 2s. 4d. the Ct. what is it a lb.? Answ. ¼d.

—— XXIII. ——

149. Bought 3 Hhds of Brandy, containing 61, 62, and 62½ Gallons, at 6s. 8d. per Gallon, I demand how much it comes to? Answ. 61k 16s. 8d.

Example.

```
                                   61
                                   62
                                   62½
Gal.            s.  d.           ───────
1 ───────────── 6 : 8 ────────── 185½
2               12               ───────
               ────               371
                80                 80
                                 ───────
                                  29680
        1    ⎧ 248(8  ⎧
    29680    ⎨ 14840  ⎨  123 | 6
    22222    ⎩ 12222  ⎩  ─────────
               111       61l. : 16s : 8d.
```

150. How much will 4 Pieces of Drugget come to, No. 1, containing 40¼ Yards, No. 2, 49½ Yards, No 3, 47 Yards, No. 4, 45¼ Yards, at 3s. 4d. the Yard? Answ. 30l. 6s. 8d.

151 Bought 4 Parcels of Butter, the firſt wighed 10Ct. 3qrs. 27lb. The ſecond 13Ct. 0qrs. 1lb. The third 23Ct. 2qrs. 0lb. The fourth 19Ct. 3qrs. 14lb. at 16s. 8d. the Ct. What do they amount to? Answ. 56l. 2s. 11d.

152. Sold 4 Hhds of Tobacco, No. 1, weighed 5 Ct. 2qrs. No. 2, 5Ct 1qr. 14lb. No. 3, 5Ct. 0qrs. 7lb. No. 4, 5Ct. 1qr 21lb at 10½d. per lb. I demand what they amount to? Answ. 104l. 14s. 9d.

153. With how many Guineas of 23s. each, could I pay for 4 Hhds. of Brandy containing 62½, 63, 62¾, and 62½ Gallons, at the Rate of 5s. per Gallon? Answ. 54 Guineas, 11s. and 9d.

154. Bought 3 Hhds. of Sugar, No. 1, weighed 7Ct. 2qrs. 11lb. No. 2, 8Ct. 1qr. 10lb. No. 3, 9Ct. 1qr. 8lb. at 37s. 4d. per Ct. I demand how much they come to, and what a pound? Answ. the whole is 47l. 3s. and 1lb. ſtands in 4d.

—— XXIV. ——

155. Suppoſe a Bale of Merchandizes, weighed 300lb. and coſt 15l. 4s 9d. pays for Duty 2d. per lb. for Freight 25s. for Porterage Home 1s. 6d. how much will 1lb. of thoſe Merchandizes ſtand me in? Answ. 15¼d.

Example.

Firſt Coſt,——	£ 15	: 04	: 9
Duty,————	02	: 10	: 0
Freight,———	01	: 05	: 0
Porterage,——	00	: 01	: 6

lb. ———— *lb.*

If 300——19 : 01 : 3——1 Answ. 15¼d.

156. Received 4 Pipes of Oil, containing 480 Gallons, coſt me 5s. 5½d. per Gallon; paid for Freight 4s. per Pipe, for Duty 6d. per Gallon, Porterage 1s. per Pipe. I demand the whole coſt, and what it ſtands me in the Gallon? Answ. 144l. and is 6s. the Gallon.

157. Bought 100 raw Ox Hides, weight 98 Ct. 2qrs. at 23s. per Ct. paid for Salt 2l. 17s. 8d. for ſalting them, &c. 8s. 6¼d. for Cellerage 1l. I demand the whole coſt, and what 1 Ct. ſtands in? Answ. 117l. 11s. 8¼d. and is 1l. 3s. 10½d. per Ct.

158. Bought 200 Carcaſſes of Beef, weight nett 850Ct 2qrs. at 6s. 6d. per Ct. and Salted them up in 400 Barrels, which coſt 2s. 9d. per Barrel, paid for 50 Barrels of Salt at 20s. per Barrel, paid for Salting and Labourers, &c. 4l. 0s. 1d. Now I want to know what one Barrel ſtands me in? Answ. 19s. 3¼d.

159. Shipped off 350 Caſks of Butter, weight 546Ct. 2qrs. 14lb. coſt 22s. 6d. per Ct. paid for Duty 6d per Ct. Cooperage 2l. 16s. 0½d. Boat Hire 18s Porterage, &c. 2l. 3s, 7d. Cellerage 3l. 4s. 7d. I demand what one hundred of the Butter ſtands me in on Board? Answ. 23s. 4d.

— XXV. —

160. Bought 3 Sorts of Brandy, and an equal Quantity of each Sort, one Sort at 5s. per Gallon, the ſecond at 6s. and the third at 7s. per Gallon, what is one Gallon worth one with another? ANSW. 6s.

Example.

Gall.

1———5
1———6
1———7
—   —   *Gall.*
If 3———18———1

ANSW. 6 Shillings.

161. Bought 3 Sorts of Vinegar, and an equal Quantity of each Sort, viz. of 3½d. 4d. and 4½d. the Quart, and mixed them together, what doth one Quart ſtand me in? ANSW. 4d.

162. Bought 4 Sorts of Salt, and of each Sort 100 Barrels, viz. of 14s. 16s. 17s. and 19s. per Barrel, and mixed them together, what doth 1 Barrel coſt me? ANSW. 16s. 6d.

163. Paid for 4 Tons of Tallow 120l. for 5 Tons 150l. 5s. for 6 Tons 192l. 10s. what doth one Ton ſtand me in one with another? ANSW. 30l. 17s.

164. Bought 102 Barrels of Wheat which coſt 62l. 4s. 140 Barrels coſt 70l. 260 Barrels coſt 143l. 18s. being all mixed, I demand the Price of 1 Barrel? ANSW. 11s.

165. A Merchant bought 3 Sorts of Tobacco, *viz.* 100lb. at 6d. per lb. 120lb. at 10d. per lb. and 200lb. at 12d. per lb. which being mixed together, tell me how much 1lb. ſtands him in? ANSW. 10d.

—— XXVI. ——

166. A Caſhier has in divers Species 109l. 12s. for which he would have Crowns of 5s. 5d. and Ducatoons of 6s. but of each Sort an equal Number. How many of each muſt he receive? ANSW 192 of each.

Example.

```
 65
 72
 —— of each   l.    s.
137——1——109 : 12
           20
        ——————
         2192
           12
        ——————
            2 ⎫
         1267 ⎪
        26374 ⎬ 192
        13777 ⎪
          133 ⎪
            1 ⎭
```

167. How many Reams of Paper of 9s. 9d. and 12s. 3d. the Ream, can I have of each Sort for 55l.? ANSW. 50 Reams of each.

168. How many Guineas of 23s. and Piſtoles of 18s. 6d. of each an equal Number, could I have for 996 Crowns of 5s. 5d.? ANSW. 130 of each.

169. How do you prove the above Anſwer to be right?

170. A Vintner paid 171l. for 3 Sorts of Wine, *viz.* at 8l. 10s. at 9l. 5s. and at 10l. 15s. the Hhd. and had of each Sort an equal Quantity, I demand how much of each Sort he had? ANSW. 6 Hhds.

171. Bought 3 Sorts of Salt, and of each Sort an equal Quantity, the Price at 14s. 16s. and 19s. the Barrel, and the whole amounted to 490l. how many Barrels had I of each Sort? ANSW. 200 Barrels.

—— XXVII. ——

172. A Merchant having bought certain Merchandizes for 1450l. with Condition to deduct 1 per Ct. for prompt Payment, I demand how much he is to pay? ANSW. 1435l. 10s.

Example.

l.	*l.*	*l.*		*l.*	*s.*	*d.*
100—	1—	14	50	1450 :	00 :	00
			20	14 :	10 :	00
		10	00	1435 :	10 :	00

173. How much muſt I pay of 1655l. deducting 1 per Ct. for prompt Payment? ANSW. 1638l. 9s.

174. How much muſt one pay of 912l. 10s. deducting 1 per Ct.? ANSW. 903l. 7s. 6d.

175. How much are 1364l. 17s. 6d. deducting 1 per Ct.? ANSW. 1351l. 4s. 6d. near enough for Merchant's Buſineſs, though in truth it is 1351l. 4s. 6$\frac{1}{10}$d.

176. How much is 6050l. deducting ½ per Ct.? ANSW. 6019l. 15s.

177. How much muſt be paid inſtead of 815l. 12s. deducting for Commiſſion $1\frac{1}{2}$ per Ct.? Answ. 803l. 7s. $3\frac{21}{25}$d.

178. What is 1537l. 17s. 8d. deducting $\frac{1}{2}$ per Ct.? Answ. 1530l. 3s. $10\frac{27}{50}$d.

179. And how much muſt I pay of 1096l. 19s. 6d. deducting $\frac{1}{4}$ per Ct.? Answ. 1094l. 4s. $7\frac{163}{200}$d.

—— XXVIII. ——

180. A Captain of a Ship being provided with 24000lb. of Bread for 200 Seamen, of which each Man eats 4lb. per Week, how long will the ſaid Bread laſt? Answ. 30 Weeks.

Example.

200
4
——— Week lb.
lb. $\cancel{8}\cancel{0}\cancel{0}$ —— 1 —— $\cancel{2}\cancel{4}\cancel{0}\cancel{0}\cancel{0}$
Answ. 30 Weeks.

181. How long would 3150lb. of Beef laſt for 25 Men, if they get $\frac{3}{4}$ lb. each, and that 3 Times a Week? Answ. 56 Weeks.

182. A Fortreſs being provided with 184000lb. of Proviſions and 700 Men, who conſume each 5lb. a Week, how long can they ſubſiſt? Answ. 52 Weeks and 4 Days.

183. Suppoſe 150 Seamen are provided with 984 Gallons and 3 Pints of Brandy for 7 Months (each Month 30 Days) what is one Man's ſhare per Day? Answ. $\frac{1}{4}$ of a Pint, or a Naggin.

—— XXIX.

—— XXIX. ——

184. How many Tiles of 8 Inches Square, would lay a Floor of 16 Feet broad and 20 Feet long? Answ. 720.

```
 8                 16
 8                 20
——      Tile     ————
64————— 1 ———————320
                  144
                 ————
                 1280
                1280
                320
               ——————
                 12
               46080 )
                6444  } 720
                 66  )
```

185. How many Yards of Cloth of 2 Feet broad will hang a Wall of 24 Feet broad and 20 Feet high? Answ. 80.

186. A Piece of Land of 80 Perches long and 70 Perches broad, is to be laid out in Meadows of 20 Perches long and 14 Perches broad, I demand how many ſuch Meadows it would make? Answ. 20.

187. How many Tiles of ¾ Foot Square would lay a Floor of 50 Feet long and 20 Feet broad? Answ. $1777\frac{7}{9}$.

188. How many Stones of 10 Inches long 9 Inches broad and 4 Inches thick, would be wanting to build a wall of 80 Feet long, 20 Feet high, and 2¼ Feet thick? Answ. 17280.

189. Suppoſe 100 Ct. 2 qrs. 14 lb. of Beef for Ships Uſe was to be cut up in Pieces of 4lb. 3lb. 2lb. 1lb. and ½ lb. and of each an equal Number, how many Pieces of each would it make? Answ. 1073 and 3½lb. over.

—— XXX. ——

Queſtions to exerciſe the Rule of Three, promiſcuouſly ſet down.

190. If 1lb. of Pepper coſt 13d. and 1lb. of Sugar 14d. how much of each can I have for 4l. 1s.? Answ. 36lb.

191. A. ſets out of a certain Town, and goes 9 Miles a Day; 7 Days after B. ſets out, and goes 12 Miles a Day, I demand in how many Days B. will overtake A.? Answ. in 21 Days.

192. If a Ton of Tallow coſt 35l. and is ſold at the Rate of 10 per Ct. Profit, I demand for how much it was ſold? Answ. 38l. 10s.

193. At what Rate muſt I ſell the above Tallow, if I have a mind to gain by 10 Tons as much as one Ton coſt? Answ. as above.

194. Suppoſe a Grey-Hound makes 27 Springs whilſt a Hare makes 25, and the Springs are alike. Now if the Hare is 50 Springs before the Hound, I would know in how many Springs the Hound will overtake her? Answ. in 675.

195. If a Ton of Butter coſt 37l. 10s. I demand at what Rate muſt I ſell it, to gain by 15 Tons as much as one Ton coſt? Answ. 40l.

196. Bought 45 Barrels of Beef, at 21s. per Barrel, among which are 16 Barrels, whereof 4 are

worth but 3 of the reſt: I demand how much muſt I pay? Answ. 43l. 1s.

197. In a beſieged Fortreſs are 5000 Men provided with ſo much Bread, that each Man may have 12 Ounces per Day. Now if 1000 are ſent among them, I would know how many Ounces each Man then may have per Day? Answ. 10 Ounces.

198. If 5 and 3 make 10, how much make 6 and 8? Answ. 17½d.

199. Two Travellers ſet out at the ſame Time, and from the ſame Place, the one goes Eaſt 24 Miles a Day, and the other goes Weſt 30 Miles a Day, in how many Days, (counting each Day 24 Hours) will they be 2150 Miles aſunder? Answ. 39Ds. 19Hs. 33⅓Min.

200. How many Guineas of 23s. and Piſtoles of 18s. 6d. of each an equal Quantity, can I have for 186l. 15s.? Answ. 90.

201. If 1 lb. of Sugar which coſt 10d. is ſold for 13½d. I demand the Gain per Ct.? Answ. 35 per Ct.

202. How many Guineas of 23s. each would pay for 10 Pieces of Tapeſtry, each Piece 25½ Yards long, and 4 Yards broad, at 15s. 8d. the ſquare Yard? Answ. 694 Guineas and 18s.

203. If 112 lb. of Tea coſt 84l. 13s. 4d. at what Rate muſt it be ſold a lb. to loſe by the whole Parcel 10l. Answ. 13. 4d.

204. If I ſell Goods at 13½d. the lb. I find to have gained 35 per Cent. I demand what the Goods were bought for? Answ. 10d. a lb.

205. A Gentleman has 510l. 8s. 4d. per Annum, I demand how much he may ſpend per Day, if he

has a mind to lay up yearly 100 Guineas at 23s. each? Answ. 21s. 8d.

206. For 20s. I bought 3 Sorts of Wine, the firſt for 8d. the ſecond for 12d. and the third for 16d. the Quart, and I had of each Sort an equal Quantity, I demand how much it was? Answ. 6⅔ Quarts.

207. A. travels 12 Miles a Day, and when he has been gone 15 Days, B. ſets out after him; I demand how many Miles in a Day B. muſt go to overtake A. in 60 Days? Answ. 15 Miles.

208. If in 4 Months I ſpend as much as I gain in 3 Months, how much can I lay up at the Year's end, if I gain every 6 Months 150l.? Answ. 75l.

209. If 840 Eggs are bought at the Rate of 10 a Penny, and 240 more at the Rate of 8 a Penny, and ſold all at 18 for 2d. I demand whether Profit or Loſs? Answ. 6d. Profit.

210. If a Piece of Cloth 30 Yards long, coſt 15l. how much will a Dutch Ell come to, if 3 Yards are equal to 4 Ells? Answ. 7½s.

211. If 2 lb. of Pepper coſt 25d. what will 60 lb. of Cloves come to, if 3 lb. of Cloves are worth 16 lb. of Pepper? Answ. 16l. 13s. 4d.

212. How many Dozen of Gloves at 8d. the Pair, will pay for 36 Dozen and 8 Pair of Stockings, at 3s. 6d. the Pair? Answ. 192½ Dozen.

213. How much would a Piece of Plank come to of 5¼ Feet long, 2½ Feet broad at one End, and 1½ Feet broad at the other End, at 8d. the ſquare Foot? Answ. 15s. 9d.

214. I bought a Parcel of Cloth at the Rate of 6s. for every two Yards, of which I ſold a certain Quantity at the Rate of 18s. for every 5 Yards, and then I found to have gained as much as 18 Yards did coſt. Now I demand how many Yards I ſold? Answ. 90 Yards.

CHAP. IX.

NOTATION and NUMERATION of FRACTIONS.

SECT. I.

A FRACTION or broken Number, is a Part or Parts of an Integer, it conſiſts of two Parts or Numbers ſet one over the other, with a Line drawn between them, as $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{13}{17}$, *&c.*

That below the Line is called the Denominator, becauſe it denominates or ſhews the Parts any whole Number is divided into, and the Number above the Line is called the Numerator, becauſe it numbers or tells how many of thoſe Parts the Fraction does conſiſt of.

When the Numerator is leſs than the Denominator, the Fraction is leſs than Unity, and this is called a proper Fraction, as $\frac{4}{5}$, $\frac{7}{8}$, $\frac{11}{12}$, $\frac{12}{43}$, *&c.*

When the Numerator is either equal to, or greater than the Denominator, it is called an improper Fraction, as $\frac{4}{4}$ is equal to 1, or $\frac{4}{3}$ is equal to $1\frac{1}{3}$, Compound Fractions, or Fractions of Fractions, are ſuch as conſiſt of more than one Numerator and one Denominator, as $\frac{1}{2}$ of $\frac{3}{4}$ of $\frac{4}{7}$, and are always connected by the Word *of.*

A mixed Number is always written thus, $2\frac{1}{2}$, or $5\frac{3}{8}$, $7\frac{2}{5}$, *&c.*

C H A P. X.

Of ABBREVIATION of FRACTIONS.

TO abbreviate or reduce a Fraction to its leaſt Term, you muſt find the greateſt common Diviſor that will divide both the Numerator and Denominator without any Remainder, and the Quotient is a new Fraction of the ſame Value, and in its loweſt Name or Term.

Rule. *Divide the Denominator by the Numerator, and then divide the laſt Diviſor by the Remainder, and ſo continue till nothing remains, then the laſt Diviſor will be the greateſt common Diviſor ſought, as ſuppoſe if* $\frac{91}{117}$ *was to be reduced, you'll find it to be equal to* $\frac{7}{9}$ *thus:*

com. 13 diviſor

$$\left.\begin{array}{r} \underbrace{26} \\ 117 \\ 91 \end{array}\right\} 1 \qquad \left.\begin{array}{r} \underbrace{13} \\ 91 \\ 26 \end{array}\right\} 3 \qquad \left.\begin{array}{r} 26 \\ 13 \end{array}\right\} 2 \qquad \frac{91}{117}\,\Bigg|\,\frac{7}{9}$$

Abbreviate or reduce the following Fractions to their loweſt Name of leaſt Term.

$\frac{12}{16}$ is equal to —— $\frac{3}{4}$

$\frac{5}{25}$ —— $\frac{1}{5}$

$\frac{24}{34}$ —— $\frac{12}{17}$

$\frac{45}{54}$ —— $\frac{5}{6}$

$\frac{144}{216}$ —— $\frac{2}{3}$

$\frac{4}{48}$ is equal to —— $\frac{1}{12}$

$\frac{9}{36}$ —— $\frac{1}{4}$

$\frac{16}{64}$ —— $\frac{1}{4}$

$\frac{114}{285}$ —— $\frac{2}{5}$

$\frac{3619}{6251}$ —— $\frac{11}{19}$

Abbreviate or reduce $\frac{59}{233}$ to its loweſt Name. Answ. There is no lower, as appears by the following Work.

$$\begin{array}{c}\underbrace{56}\\ \cancel{233}\\ \cancel{59}\end{array}\left\{3\right. \quad \begin{array}{c}\underbrace{3}\\ \cancel{59}\\ \cancel{56}\end{array}\left\{1\right. \quad \begin{array}{c}\underbrace{2}\\ \cancel{56}\\ \cancel{33}\end{array}\left\{18\right. \quad \begin{array}{c}\underbrace{1}\\ \cancel{3}\\ \cancel{2}\end{array}\left\{1\right. \quad \begin{array}{c}\\ \cancel{2}\\ \cancel{1}\end{array}\left\{2\right.$$

C H A P. XI.

ADDITION OF FRACTIONS.

SECT. I.

OF Simple Fractions which have one common Denominator.

Rule 1. *Add their Numerators together, and place the Sum over one of the given Denominators.*

Example.

Add $\frac{3}{5}$ to $\frac{1}{5}$. Answ. $\frac{4}{5}$.

Thus,

$$\begin{array}{c}\frac{1}{5}\\ \frac{3}{5}\\ \hline\end{array}$$

Answ. $\frac{4}{5}$

Add the following Fractions together, *viz.*

$\frac{2}{7}$ and $\frac{4}{7}$ the Sum is	$\frac{6}{7}$	$\frac{7}{24}$, $\frac{11}{24}$, and $\frac{13}{24}$ Sum is	$1\frac{7}{24}$
$\frac{2}{9}$ and $\frac{4}{9}$ ——————	$\frac{2}{3}$	$\frac{11}{20}$, $\frac{7}{20}$, and $\frac{9}{20}$, ——————	$1\frac{7}{20}$
$\frac{1}{10}$ and $\frac{1}{10}$ ——————	$\frac{2}{5}$	$\frac{1}{14}$, $\frac{11}{14}$, and $\frac{9}{14}$, ——————	$1\frac{1}{2}$
$\frac{5}{12}$ and $\frac{1}{12}$ ——————	$\frac{1}{2}$	$\frac{15}{16}$, $\frac{13}{16}$, $\frac{11}{16}$, and $\frac{7}{16}$ ——————	$2\frac{7}{8}$

—— II.

—II.—

Of mixt numbers with one common Denominator.

Rule 2. *By Rule 1, add the fractional Parts and the Integers as in whole numbers.*

Example.

Add 17$\frac{3}{5}$ to 12$\frac{1}{5}$. ANSW. 29$\frac{4}{5}$.

The Work.

$$\begin{array}{rr} & 17\frac{3}{5} \\ & 12\frac{1}{5} \\ \hline \text{Sum,} & 29\frac{4}{5} \end{array}$$

Sums to be added, *viz.*

13$\frac{1}{15}$, 9$\frac{4}{15}$, 3$\frac{7}{15}$, and 5. The Sum is————30$\frac{4}{5}$

1$\frac{1}{12}$, 2$\frac{5}{12}$, 3$\frac{7}{12}$, and 4$\frac{11}{12}$,————12

9$\frac{13}{14}$, 7$\frac{9}{14}$, 5$\frac{5}{14}$, 16, 8, and $\frac{11}{14}$,————47$\frac{5}{7}$

—III.—

To add Fractions which have no common Denominator.

This may be done two Ways; *viz.*

Rule 3. *Multiply all the Denominators together, and the Product will be a common Denominator, in which divide each particular Denominator, whose Quotient multiply by its Numerator, and those Products being added together. is a new Numerator to the common Denominator, and total Sum required.*

Example.

Example.

Add $\frac{3}{8}$, $\frac{5}{9}$, and $\frac{7}{12}$ together.
Com. $\underbrace{864}$ Denomi.

$$\begin{array}{r}
8\\
9\\
\hline
72\\
12\\
\hline
864
\end{array}
\qquad\qquad
\begin{array}{lr}
\frac{3}{8}\text{———————} & 324\\
\frac{5}{9}\text{———————} & 480\\
\frac{7}{12}\text{———————} & 504\\
\hline
 & 1308
\end{array}$$

divide $\frac{1308}{864}$ equal to $1\frac{37}{72}$.

But it is beſt to find the leaſt common Denominator, which will ſhorten the Work. Thus,

Rule 4. *If there are two or more of the given Denominators that can be divided by any one Number, divide them, and if their Quotients are capable of being divided by any Number or in themſelves, divide once more, and when you can divide no more, multiply the laſt Quotients by one another, and the Product multiply by the Diviſor or Diviſors, and you have the leaſt common Denominator required.*

Example II.

As before, let $\frac{3}{8}$, $\frac{5}{9}$, and $\frac{7}{12}$ be added together.

$$\begin{array}{l}
\cancel{8} : 9 : \cancel{12}\\
\cancel{4}\text{———————}\\
2 : \cancel{9} : \cancel{3}\\
\cancel{3}\text{———————}\\
2 : \underbrace{3}_{6} : 1\\
\qquad 3\\
\hline
\qquad 18\\
\qquad 4\\
\hline
\end{array}$$

Com. 72 Denomi.

$$\begin{array}{lr}
\frac{3}{8}\ \text{- - -} & 27\\
\frac{5}{9}\ \text{- - -} & 40\\
\frac{7}{12}\ \text{- - -} & 42\\
\hline
 & 109
\end{array}$$

Answ. $\frac{109}{72}$ equal to $1\frac{37}{72}$

The leaſt Com. 72 Denomi.

Add the following Fractions together, *viz.*

$\frac{5}{6}$ and $\frac{2}{3}$ the Sum is $1\frac{1}{2}$
$\frac{3}{4}$ and $\frac{11}{12}$ ———— $1\frac{2}{3}$
$\frac{1}{8}$ and $\frac{5}{6}$ ———— $\frac{23}{24}$
$\frac{3}{4}$ $\frac{5}{6}$, and $\frac{7}{8}$ ———— $2\frac{11}{24}$

$\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{7}$ and $\frac{1}{8}$, Answ. $\frac{271}{280}$
$\frac{4}{5}$, $\frac{5}{6}$, $\frac{6}{7}$, $\frac{3}{8}$ and $\frac{8}{11}$, ———— $3\frac{5477}{9240}$
$\frac{1}{5}$, $\frac{7}{10}$ $\frac{7}{12}$, and $\frac{5}{44}$, ———— $\frac{6719}{7920}$
$\frac{1}{3}$, $\frac{1}{4}$, $1\frac{1}{3}$, and $\frac{11}{25}$, ———— $\frac{1049}{1300}$

— IV. —

The Uſe.

1. A Merchant bought 5 Pieces of Cloth, the firſt $40\frac{3}{4}$ Yards long, the ſecond $38\frac{1}{2}$ Yards, the third $40\frac{3}{8}$ Yards, the fourth $41\frac{1}{16}$ Yards, the fifth $42\frac{1}{4}$ Yards. I demand how many Yards there were in all? Answ. $202\frac{15}{16}$ Yards.

2. Another Merchant ſold 4 Bales of Spice, No. 1, Wt. $150\frac{1}{2}$lb. No. 2, Wt. $139\frac{3}{4}$lb. No. 3, Wt. $162\frac{2}{3}$lb. No. 4, $170\frac{1}{8}$lb. I demand how many lb. they weighed together? Answ. $623\frac{1}{24}$lb.

3. A Grocer ſold the following Parcels of Sugar, *viz.* $16\frac{1}{2}$lb. $19\frac{1}{4}$lb. $13\frac{3}{4}$lb. $20\frac{1}{8}$lb. $25\frac{1}{16}$lb. $30\frac{5}{6}$lb. and $11\frac{1}{4}$lb. I demand how many lb. he ſold in all? Answ. $136\frac{37}{48}$lb.

CHAP. XII.

MULTIPLICATION of FRACTIONS.

SECT. I.

To multiply a Simple Fraction by a Simple Fraction.

Rule 1. *Multiply the Numerators together for a new Numerator, and the Denominators together, for a new Denominator, and 'tis done.*

Example.

$\frac{3}{4}$ multiplied by $\frac{5}{8}$ produce $\frac{15}{32}$.

Thus,

$$\begin{array}{ccc} 3 & \text{———} & 5 \\ \overline{4} & & \overline{8} \\ \hline \end{array}$$

Product $\frac{15}{32}$

Multiply the following Fractions.

$\frac{7}{12}$ by $\frac{5}{6}$ Product -	$\frac{35}{72}$	$\frac{14}{15}$ by $\frac{5}{8}$ Product - -	$\frac{7}{12}$
$\frac{1}{4}$ by $\frac{2}{3}$ - - -	$\frac{1}{6}$	$\frac{128}{135}$ by $\frac{5}{12}$ - - - -	$\frac{32}{81}$
$\frac{5}{8}$ by $\frac{4}{5}$ - - -	$\frac{1}{2}$	$\frac{13}{14}$ by $\frac{74}{75}$ - - - -	$\frac{481}{525}$
$\frac{1}{4}$ by $\frac{1}{2}$ - - -	$\frac{1}{8}$	$\frac{314}{453}$ by $\frac{177}{316}$ - - - -	$\frac{9263}{23858}$

—— II. ——

To multiply whole Numbers, by a Simple Fraction.

Rule 2. *Make the Integer like a Fraction, by putting 1 under it, then proceed as before.*

Example.

How much is 3 Times $\frac{1}{4}$? Answ. $\frac{3}{4}$.

Thus,

$$\begin{array}{ccc} 3 & \text{———} & 1 \\ \overline{1} & \text{———} & \overline{4} \\ \hline & \frac{3}{4} & \end{array}$$

Sums to be multiplied.

5 by $\frac{1}{8}$ the Product is	$\frac{5}{8}$	7 by $\frac{3}{4}$ Product -	$5\frac{1}{4}$
18 by $\frac{2}{9}$ - - - -	4	16 by $\frac{5}{6}$ - - - -	$13\frac{1}{3}$
48 by $\frac{5}{12}$ - - -	20	34 by $\frac{15}{16}$ - - - -	$31\frac{7}{8}$
8 by $\frac{2}{3}$ - - - -	$5\frac{1}{3}$	100 by $\frac{13}{24}$ - - - -	$54\frac{1}{6}$

—— III.

—— III. ——

To multiply a mixt Number by a Simple Fraction, or a whole Number.

Rule 3. *Reduce the mixt Number into an improper Fraction, by multiplying the Integral Part by the Denominator of the Fractional Part, and to the Product add the Numerator of the ſaid Fractional Part, the Sum is a Numerator to the former Denominator, then proceed as before.*

Example.

If $4\frac{1}{2}$ are multiplied by 6, the Product is 27.

Thus,

$$\begin{array}{lcr} 4\frac{1}{2} & & \\ \text{—} & & \\ 9 & \text{———} & 6 \\ \text{—} & & \text{—} \\ 2 & \text{———} & 1 \\ \hline \multicolumn{3}{l}{\left.\begin{matrix}54\\22\end{matrix}\right\}27} \end{array}$$

or Thus,

$$\begin{array}{r} 6 \\ 4\frac{1}{2} \\ \hline 24 \\ 3 \\ \hline 27 \end{array}$$

Multiply the following Sums, *viz.*

8 by $5\frac{2}{3}$ Prod. -	$45\frac{1}{3}$	$\frac{3}{4}$ by $8\frac{1}{3}$ Prod. -	$6\frac{1}{4}$
$7\frac{1}{8}$ by 12 - - -	$85\frac{1}{2}$	$12\frac{1}{2}$ by $\frac{3}{8}$ - - -	$4\frac{11}{16}$
20 by $10\frac{7}{9}$ - - -	$215\frac{5}{9}$	$\frac{11}{15}$ by $10\frac{1}{2}$ - - -	$7\frac{21}{30}$
$5\frac{5}{6}$ by 100 - - -	$583\frac{1}{3}$	$\frac{15}{16}$ by $30\frac{4}{5}$ - - -	$28\frac{7}{8}$

—— IV. ——

To multiply mixt Numbers by mixt Numbers.

Rule 4. *Reduce them into improper Fractions, by the 3d Rule, and proceed as before.*

Example.

How much is $5\frac{1}{2}$ Times $6\frac{3}{4}$? Answ. $37\frac{1}{8}$.

$$\frac{11}{2} \text{———} \frac{27}{4}$$

$$\begin{array}{l} \cancel{8}(1 \\ \cancel{2}\cancel{9}\cancel{7} \\ \;\cancel{8}\cancel{8} \end{array} \Bigg\} \; 37\frac{1}{8}$$

Multiply the following Sums, *viz.*

$37\frac{1}{3}$ by $3\frac{5}{6}$ Product - - - - - - - - $143\frac{1}{9}$
$2\frac{16}{17}$ by $31\frac{11}{19}$ - - - - - - - - - $92\frac{284}{323}$
$19\frac{4}{15}$ by $17\frac{7}{12}$ - - - - - - - - - $338\frac{139}{180}$
$35\frac{13}{16}$ by $11\frac{17}{25}$ - - - - - - - - - $418\frac{29}{100}$

— V. —

To multiply compound Fractions, obſerve the firſt Rule.

Example.

How much is $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{1}{5}$? Answ. $\frac{1}{40}$.

$$\frac{1}{2} \text{———} \frac{1}{4} \text{———} \frac{1}{5} \qquad \begin{array}{r} 4 \\ \underline{2} \\ 8 \\ \underline{5} \\ 40 \end{array}$$

Answ. $\frac{1}{40}$

Multiply the following Fractions, *viz.*

$\frac{7}{8}$ of $\frac{1}{3}$ by $\frac{2}{5}$ the Product is - - $\frac{7}{60}$
$\frac{1}{2}$ of $\frac{1}{4}$ by 16 - - - - 2
$\frac{2}{5}$ of $\frac{3}{7}$ by $\frac{11}{12}$ - - - - $\frac{11}{70}$
$\frac{3}{4}$ of $\frac{1}{3}$ by $11\frac{7}{8}$ - - - - $2\frac{31}{32}$
$\frac{7}{17}$ of $3\frac{4}{7}$ by 8 - - - - $11\frac{13}{17}$

—VI.—

The Use.

1. How many Pence are in $\frac{5}{6}$ of a Shilling? Answ. 10d.

Example.

$$\begin{array}{ccc} s. & & d. \\ 5 & \text{———} & 12 \\ \overline{6} & \text{———} & \overline{1} \\ \hline \end{array} \qquad \begin{array}{ccc} s. & & d. \\ 5 & \text{———} & 12:2 \\ \overline{6} & \text{———} & \overline{1} \\ \hline \end{array}$$

$$\left.\begin{matrix} 6\cancel{0} \\ \cancel{6}6 \end{matrix}\right\} 10d. \qquad\qquad 10d.$$

2. How many Pence are in $\frac{2}{3}$ of a Shilling? Answ. 8d.

3. How many Shillings are in $\frac{4}{5}$ of a l. Sterling? Answ. 16s.

4. How much is $\frac{1}{8}$ of a Hundred Weight? Answ. 14lb.

5. What is the Value of $\frac{11}{16}$ of a l. Sterling? Answ. 13s. 9d.

6. How much is $\frac{2}{7}$ of a Hundred Weight? Answ. 32 lb.

7. What is the $\frac{5}{8}$ of a l. Sterling? Answ. 12s. 6d.

8. How much is the $\frac{5}{8}$ of a lb. Avoir-du-pois? Answ. 10 oz.

—— VII. ——

9. What is the value of $\frac{1}{4}$ of $\frac{3}{4}$ of a Shilling? Answ. $2\frac{1}{4}$d.

Example.

$$\begin{array}{ccccc} & & s. & & d. \\ \frac{1}{4} & \text{———} & \frac{3}{4} & \text{———} & \frac{12}{1} \end{array} \qquad \begin{array}{ccc} \multicolumn{3}{c}{\textit{Or Thus.}} \\ \frac{9}{1} & \text{———} & \frac{1}{4} \end{array}$$

$$\left.\begin{array}{c} 4 \\ \cancel{36} \\ \cancel{16} \end{array}\right\} 2\tfrac{4}{16} = 2\tfrac{1}{4}\text{d.} \qquad \left.\begin{array}{c} 1 \\ \cancel{9} \\ \cancel{4} \end{array}\right\} 2\tfrac{1}{4}\text{d.}$$

10. What is the Value of $\frac{7}{8}$ of $\frac{3}{4}$ of a l. Sterling? Answ. 13s. $1\frac{1}{2}$d.

11. How much is $\frac{3}{16}$ of $\frac{2}{3}$ of a l. Sterling? Answ. 2s. 6d.

12. If one Yard of Cloth coſt 17d. what will half a Quarter come to? Answ. $2\frac{1}{8}$d.

13. What will $\frac{1}{3}$ of $\frac{3}{4}$ of an Ounce Avoir-du-pois come to, at 7s. the lb.? Answ. $1\frac{5}{16}$d.

—— VIII. ——

14. If 1 Yard of Cloth coſt 2s. 6d. what will $2\frac{1}{2}$ Yards come to? Answ. 6s. 3d.

Example.

$$\begin{array}{ccc}
\textit{Yds.} & & \textit{s.}\\
2\frac{1}{2} & & 2\frac{1}{2}\\
\text{—} & & \text{—}\\
5 & \text{————} & 5\\
\text{—} & & \text{—}\\
2 & \text{————} & 2\\
\hline
\end{array}
\qquad\qquad
\begin{array}{c}
\textit{Or Thus.}\\
2\frac{1}{2}\\
2\frac{1}{2}\\
\text{—}\\
\\
4\\
1\frac{1}{4}\\
1\\
\hline
6\frac{1}{4}\text{s.}
\end{array}$$

$$\left.\begin{array}{c}1\\ \smile\\ \cancel{25}\\ \cancel{4}\end{array}\right\}6\frac{1}{4}\text{s.}$$

15. What will 6¼lb. of Indigo come to, at 5s. 6d. the ℔.? Answ. 1l. 14s. 4½d.

16. If 1 Ounce of Silk coſt 7¾d. what will 3¾ Ounces come to? Answ. 2s. 1$\frac{3}{16}$d.

17. How much will 10 Yards and half a Quarter of Cloth come to, at the Rate of 11¾s. the Yard? Answ. 5l. 18s. 11⅝.

18. How many ſquare Feet are in a Plank of 20½ Feet long, and 15 Inches broad? Answ. 25⅝ Feet.

19. How many ſquare Yards are in a Wainſcot of 9 Feet 8 Inches high, and 15 Feet 3 Inches broad? Answ. 16 Yards 3$\frac{5}{12}$ Feet.

——— IX. ———

20. What would the Workmanſhip of a Wall come to, of 60½ Perches long, and ¼ Perch high, at 8½d. the Perch? Answ. 10s. 8$\frac{9}{16}$d.

Example.

Example.

$$
\begin{array}{ccccc}
60\frac{1}{2} & & & & 8\frac{1}{2} \\
\cline{1-1}
121 & \text{————} & 1 & \text{——} & 17 \\
\cline{1-1}\cline{3-3}\cline{5-5}
2 & \text{————} & 4 & \text{——} & 2 \\
4 & & 121 & & \\
2 & & 17 & & \\
\cline{1-1}\cline{3-3}
8 & & 847 & & \\
2 & & 121 & & \\
\cline{1-1}\cline{3-3}
16 & & & &
\end{array}
$$

$$
\begin{array}{r}
\cancel{4}\cancel{3}(9 \\
\cancel{2}\cancel{0}\cancel{5}\cancel{7} \\
\cancel{1}\cancel{6}\cancel{6}\cancel{6} \\
\cancel{1}\cancel{1}
\end{array}
\left\{
\begin{array}{r}
(8 \\
\cancel{1}\cancel{2}\cancel{8} \\
\cancel{1}\cancel{2}\cancel{2} \\
\cancel{1}
\end{array}
\right\}
\begin{array}{ccc}
\text{s.} & & \text{d.} \\
10 & : & 8\frac{9}{16}
\end{array}
$$

Or this way.

$$
\begin{array}{ll}
\cancel{6}\cancel{0}\frac{1}{2} & \left\{ \begin{array}{r} 15\frac{1}{8} \\ 8\frac{1}{2} \end{array} \right. \\
\cancel{4} & \\
\cline{2-2}
 & 120 \\
 & 7\frac{1}{2} \\
 & 1\frac{1}{16} \\
\cline{2-2}
 & 128\frac{9}{16} \\
\cancel{1}\cancel{2} & \text{————} \\
 & 10 : 8\frac{9}{16}
\end{array}
$$

21. A Floor of $3\frac{1}{2}$ Yards broad, and $5\frac{1}{3}$ Yards long, being laid with Stones at the Rate of $5\frac{1}{2}$s. the ſquare Yard, what does it amount to? ANSW. 5l. 2s. 8d.

22. How much would the painting of a wainſcotted Room come to, of 16 Feet ſquare, and 11 Feet high, at the Rate of $6\frac{1}{2}$d. the ſquare Yard? ANSW. 2l. 2s. $4\frac{4}{9}$d.

23. How much will an Oak Plank come to, of $20\frac{1}{2}$ Feet long, $1\frac{1}{4}$ Feet broad, at $6\frac{1}{2}$d. the ſquare Foot? ANSW. 13s. $10\frac{9}{16}$d.

24. How many Cubical Feet are in 100 Stones of 28 Inches long, 21 Inches broad, and 8 Inches thick? ANSW. $272\frac{2}{9}$ Feet.

25. How many Cubical Feet are in a Beam of $22\frac{1}{4}$ Feet long, 13 Inches broad, and 8 Inches thick? ANSW. $16\frac{5}{72}$ Feet.

26. What will $7\frac{1}{8}$ oz. of Silver come to, if 1 oz. coſt $5\frac{1}{4}$s.? Answ. 1l. 17s. $4\frac{7}{8}$d.

27. A. has $\frac{1}{2}$ of a Ship, of which he ſells to B. $\frac{3}{4}$, and B. ſells out of his Share to C. $\frac{1}{2}$. I demand what ſhare C. has in the Ship, and alſo A. and B's. Shares? Answ. A. $\frac{1}{8}$, B. $\frac{3}{16}$, and C. $\frac{3}{16}$.

28. How many Tiles of 12 Inches ſquare would lay a Floor of $15\frac{3}{4}$ Feet broad, and $17\frac{1}{4}$ long? Answ. $271\frac{11}{16}$ Tiles.

29. Suppoſe a Marble Stone of $6\frac{1}{2}$ Feet long, $4\frac{3}{4}$ Feet broad, $2\frac{1}{3}$ Feet thick, was ſold at the Rate of $5\frac{1}{2}$s. the Cubical Foot; I demand what it would amount to? Answ. 19l. 16. $2\frac{3}{4}$d.

30. If 1 Ounce of Gold is worth 4l. what is 1 Grain worth? Answ. 2d.

Note. *The above Sum can be ſolved (the ſtating the Queſtion excepted) by one Figure, which is the Anſwer.*

CHAP. XIII.

SUBTRACTION OF FRACTIONS.

SECT. I.

TO ſubtract Simple Fractions, from Simple Fractions, which have one common Denominator.

Rule 1. *Subtract the leſſer Numerator from the greater, and under the Remainder put the Denominator.*

Examples.

From	$\frac{5}{7}$	$\frac{5}{8}$	$\frac{11}{12}$	$\frac{15}{16}$	$\frac{17}{35}$	$\frac{105}{209}$
Take	$\frac{2}{7}$	$\frac{3}{8}$	$\frac{5}{12}$	$\frac{3}{16}$	$\frac{13}{35}$	$\frac{99}{209}$
Reſt	$\frac{3}{7}$	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{4}{35}$	$\frac{6}{209}$

II.

To ſubtract a Fraction, or mixt Number from a whole Number.

Rule 2. *Take the Numerator from the Denominator, and under the Remainder put the Denominator, and carry one to be ſubtracted from the whole Number.*

Examples.

From	1	3	6	10	9	100
Take	$0\frac{3}{5}$	$0\frac{3}{16}$	$0\frac{7}{8}$	$0\frac{1}{10}$	$5\frac{1}{2}$	$99\frac{99}{100}$
Reſt	$0\frac{2}{5}$	$2\frac{13}{16}$	$5\frac{1}{8}$	$9\frac{9}{10}$	$3\frac{1}{2}$	$0\frac{1}{100}$

III.

To ſubtract mixt Numbers from mixt Numbers, having common Denominators.

Rule 3. *By Rule the firſt ſubtract the fractional Part, and then ſubtract the Integer.*

Examples.

From	$3\frac{2}{3}$	$100\frac{3}{4}$	$19\frac{15}{16}$	$97\frac{19}{24}$	$99\frac{21}{24}$
Take	$2\frac{1}{3}$	$10\frac{3}{4}$	$11\frac{7}{16}$	$9\frac{11}{24}$	$7\frac{19}{24}$
Reſt	$1\frac{1}{3}$	90	$8\frac{1}{2}$	$88\frac{1}{3}$	$92\frac{1}{12}$

IV.

—— IV. ——

To ſubtract Simple Fractions which have no common Denominator.

Rule 4. *By the third or fourth Rule of the third Section of Addition of Fractions, find a common Denominator, in which divide each particular Denominator, whoſe Quotient multiply by its Numerator, and thoſe Products ſubtract, and the Remainder is a new Numerator to the common Denominator, and the Anſwer required.*

Example.

What diff. $\frac{2}{3}$ from $\frac{7}{9}$? Answ. $\frac{1}{9}$.

$$\begin{array}{ccc} & \underbrace{9} & \\ \frac{7}{9} & \text{———} & 7 \\ \frac{2}{3} & \text{———} & 6 \\ \text{—} & & \text{—} \\ 3 & & \frac{1}{9} \end{array}$$

Subtract the following Fractions.

From	$\frac{5}{8}$	$\frac{11}{12}$	$\frac{5}{6}$	$\frac{14}{15}$	$\frac{8}{15}$	$\frac{17}{21}$	$\frac{200}{216}$
Take	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{3}{5}$	$\frac{9}{20}$	$\frac{9}{14}$	$\frac{7}{144}$
Reſt	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{30}$	$\frac{1}{3}$	$\frac{1}{12}$	$\frac{1}{6}$	$\frac{379}{432}$

—— V ——

To ſubtract a Fraction or mixt Number from a mixt Number, when the fractional Part to be ſubtracted is greater than the fractional Part from whence it is to be ſubtracted.

Rule 5. *Find a common Denominator, &c. as in the preceding Section, then add the new found Numerator of the leſſer Fraction, to the common Denominator,*

nator, and from that Sum ſubtract the new found Numerator of the greater Fraction, and the Remainder ſet as a new Numerator over the common Denominator, then carry one to the integral Part of the Subtrahend, and ſubtract, as in whole Numbers.

Example.

Subtract $2\frac{1}{3}$ from $5\frac{1}{4}$ remain $2\frac{11}{12}$

$$\begin{array}{llr} & \overset{12}{\smile} & \\ 5\frac{1}{4} & \text{———————} 3 \text{ and } 12 \text{ are} & 15 \\ & & 4 \\ 2\frac{1}{3} & \text{———————} 4 & \overline{} \\ \overline{} & & \frac{11}{12} \\ 2\frac{11}{12} & & \end{array}$$

More Examples as before, *viz.*

From	$6\frac{5}{7}$	$10\frac{3}{16}$	$12\frac{5}{12}$	$19\frac{5}{11}$	$13\frac{1}{9}$
Take	$0\frac{6}{7}$	$1\frac{7}{12}$	$6\frac{1}{2}$	$0\frac{7}{15}$	$9\frac{15}{27}$
Reſt	$5\frac{6}{7}$	$8\frac{29}{48}$	$5\frac{11}{12}$	$18\frac{163}{165}$	$3\frac{5}{9}$

—— VI. ——

What differs $\frac{9}{14}$ from $\frac{17}{21}$? Answ. - - $\frac{1}{6}$

What does $\frac{7}{144}$ differ from $\frac{209}{216}$? Answ. - $\frac{397}{432}$

What difference is there between $10\frac{7}{8}$ and $12\frac{1}{2}$? Answ $1\frac{5}{8}$

Take 10 $\frac{1}{2}$ from $100\frac{1}{32}$ remain - - $89\frac{91}{96}$

What differs $\frac{9}{16}$ from $\frac{1}{3}$? Answ. - - - $\frac{11}{48}$

What does $\frac{9}{20}$ differ from $\frac{8}{15}$? Answ. - $\frac{1}{12}$

⁂ NOTE. *If one cannot diſtinguiſh the greater of two Fractions, that whoſe Numerator being multiplied by the Denominator of the other Fraction, makes the greateſt Number, is the greateſt Fraction.*

CHAP. XIV.

DIVISION OF FRACTIONS.

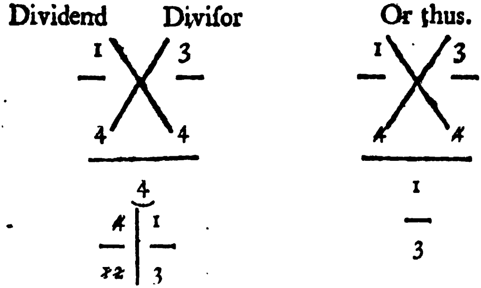
SECT. I.

To divide Simple Fractions.

RULE 1. *Set the Dividend to the left Hand of the Diviſor, and multiply acroſs, that is the Denominator of the Diviſor by the Numerator of the Dividend, and the Product is a new Numerator, then multiply the Denominator of the Dividend by the Numerator of the Diviſor, and the Product is a new Denominator.*

Example.

Divide $\frac{1}{4}$ by $\frac{3}{4}$, comes $\frac{4}{12}$ equal to $\frac{1}{3}$



More Examples of the ſame Nature.

$\frac{1}{5}$ by $\frac{2}{5}$	comes -	$\frac{1}{2}$	$\frac{3}{4}$ by $\frac{8}{9}$	comes -	$\frac{27}{32}$
$\frac{5}{9}$ by $\frac{8}{9}$	- - -	$\frac{5}{8}$	$\frac{1}{3}$ by $\frac{5}{6}$	- -	$\frac{2}{5}$
$\frac{3}{4}$ by $\frac{1}{4}$	- - -	3	$\frac{15}{16}$ by $\frac{5}{8}$	- -	$1\frac{1}{2}$
$\frac{11}{15}$ by $\frac{19}{20}$	- - -	$\frac{44}{57}$	$\frac{23}{35}$ by $\frac{21}{27}$	- -	$\frac{621}{735}$

—— II.

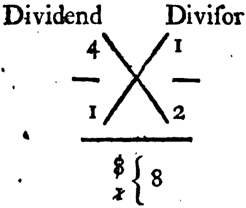
—II.—

To divide a whole Number by a Simple Fraction, and the contrary.

Rule 2. *Make the whole Number an improper Fraction by putting an Unit for a Denominator, and proceed as before.*

Example.

Divide 4 by $\frac{1}{2}$ the Quotient is 8.



Divide the following Fractions, *viz.*

$\frac{1}{2}$ by 4 comes -	$\frac{1}{8}$	1 by $\frac{1}{3}$ comes	3
8 by $\frac{3}{4}$ - -	$10\frac{2}{3}$	$\frac{5}{6}$ by 15 - -	$\frac{1}{18}$
$\frac{3}{4}$ by 8 - -	$\frac{3}{32}$	24 by $\frac{5}{8}$ - -	$38\frac{2}{5}$
10 by $\frac{5}{6}$ - -	12	$\frac{5}{6}$ by 100 -	$\frac{1}{120}$

—III.—

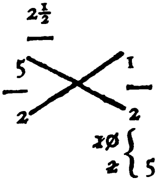
To divide a mixt Number by a Simple Fraction, and the contrary.

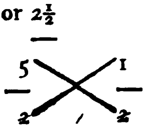
Rule 3. *Reduce the mixt Number into an improper Fraction, by Rule 3, of Multiplication of Fractions, and proceed as before.*

Example.

Example.

How often is $\frac{1}{2}$ contained in $2\frac{1}{2}$? Answ. 5 Times.





Answ. 5.

Divide the following Fractions, *viz.*

$3\frac{1}{8}$ by $\frac{3}{8}$	Answ. $8\frac{1}{3}$	$4\frac{1}{2}$ by $\frac{3}{4}$	Answ. 6
$\frac{3}{4}$ by $4\frac{1}{2}$	- $\frac{1}{6}$	$\frac{3}{8}$ by $3\frac{1}{8}$	- $\frac{3}{25}$
$12\frac{1}{9}$ by $\frac{5}{18}$	- $43\frac{3}{5}$	$2\frac{1}{3}$ by $\frac{7}{8}$	- $2\frac{2}{3}$
$\frac{7}{8}$ by $2\frac{1}{3}$	- $\frac{3}{8}$	$\frac{5}{14}$ by $2\frac{1}{7}$	- $\frac{1}{6}$

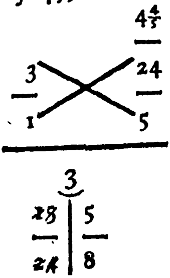
—IV.—

To divide a whole Number by a mixt Number, and the contrary.

Rule 4. *Reduce both the whole Number and mixt Number into improper Fractions, and proceed as before.*

Example.

Divide 3 by $4\frac{4}{5}$, the Product is $\frac{5}{8}$.



Divide the following Fractions; *viz.*

7 by $8\frac{5}{8}$	Quotient	$\frac{56}{69}$		108 by $6\frac{3}{7}$	Quot.		$16\frac{4}{5}$
$25\frac{1}{2}$ by 5	-	$5\frac{1}{10}$		$119\frac{1}{4}$ by 8		-	$14\frac{29}{32}$
34 by $3\frac{7}{9}$	-	9		25 by $3\frac{1}{5}$		-	$7\frac{13}{16}$
$1\frac{1}{9}$ by 15	-	$0\frac{2}{27}$		$9\frac{1}{7}$ by 11		-	$0\frac{6}{7}$

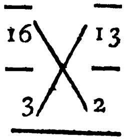
— V. —

To divide mixt Numbers by mixt Numbers.

Rule 5. *Reduce them both into improper Fractions, and proceed as before.*

Example.

Divide $5\frac{1}{3}$ by $6\frac{1}{2}$, the Product is $\frac{32}{39}$.



Answ. $\frac{32}{39}$.

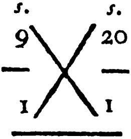
Divide the following Sums, *viz.*

$9\frac{3}{4}$ by $13\frac{1}{2}$	Quotient	$\frac{13}{18}$		$10\frac{5}{6}$ by $4\frac{2}{3}$	Quot. -	$2\frac{9}{28}$
$1\frac{1}{13}$ by $5\frac{5}{39}$	-	$\frac{7}{260}$		$60\frac{9}{16}$ by $26\frac{11}{12}$	-	$2\frac{1}{4}$
$6\frac{1}{2}$ by $5\frac{1}{3}$	-	$1\frac{7}{32}$		$1\frac{1}{2}$ by $2\frac{1}{2}$	-	$0\frac{3}{5}$

— VI. —

The Uſe.

1. What Part is 9s. of a l. Sterling? Answ. $\frac{9}{20}$.



Answ. $\frac{9}{20}$.

2. What Part of a l. Sterling is 15s.? Answ. $\frac{3}{4}$l.
3. What Part of a lb. Troy is 4 oz.? Answ. $\frac{1}{3}$lb.
4. What Part of an Ct. is 84lb.? Answ. $\frac{3}{4}$.
5. What Part of a Ton is 4 Ct.? Answ. $\frac{1}{5}$.
6. What Part of a Shilling is 8d.? Answ. $\frac{2}{3}$.

— VII. —

7. What Part of a Shilling is $\frac{1}{2}$d.? Answ. $\frac{1}{24}$.

$$\begin{array}{ccc} d. & & d. \\ \frac{1}{2} & \times & \frac{12}{1} \end{array}$$

Answ. $\frac{1}{24}$

8. What Part of a lb. is $\frac{3}{4}$ of an Ounce Avoir-du-pois Wt.? Answ. $\frac{3}{64}$.

9. What Part of a Penny is the $\frac{1}{2}$ of a Farthing? Answ. $\frac{1}{8}$.

10. What Part of a Shilling is $\frac{3}{4}$d.? Answ. $\frac{3}{48}$.

11. What Part of a l. Sterling is $\frac{5}{6}$s.? Answ. $\frac{1}{24}$

12. What Part of a Ct. is $\frac{1}{4}$ lb.? Answ. $\frac{1}{448}$.

13. What Part of a lb. Troy is $\frac{1}{4}$ of an Ounce? Answ. $\frac{1}{48}$.

— VIII. —

14. What Part of a l. Sterling is 2s. 6d.? Answ. $\frac{1}{8}$.

$$\begin{array}{ccc} \overline{2\frac{1}{2}\text{s.}} & & \\ \frac{5}{2} & \times & \frac{\cancel{20}\ :\ 4}{1} \end{array}$$

Answ. $\frac{1}{8}$.

15. What Part of a l. is 6s. 8d.? Answ. $\frac{1}{3}$.
16. What Part of a Shilling is 1$\frac{1}{2}$d.? Answ. $\frac{1}{8}$.
17. What Part of a l. is 3s. 4d.? Answ. $\frac{1}{6}$.
18. What Part of a l. is 12s. 6d.? Answ. $\frac{5}{8}$.
19. What Part is 1$\frac{1}{2}$ Pint of a Gallon? Answ. $\frac{3}{16}$.
20. What Part is 8s. 9d. of a l.? Answ. $\frac{7}{16}$.
21. What Part is 5$\frac{1}{4}$d. of a Shilling? Answ. $\frac{7}{16}$.

—— IX. ——

22. What Part is 6s. 2$\frac{1}{2}$d. of a l. Sterling? Answ. $\frac{149}{480}$.

Example.

s. : *d.*
6 : 2$\frac{1}{2}$.
12

74$\frac{1}{2}$

$$\frac{149}{2} \times \frac{240d.}{1}$$

Answ. $\frac{149}{480}$.

23. What Part of a l. Sterling is 11s. 4$\frac{1}{2}$d.? Answ. $\frac{91}{160}$.

24. What Part is 3 qrs. 7lb. of a hundred Wt.? Answ. $\frac{13}{16}$.

25. What Part of a l. Sterling is 5s. 0$\frac{3}{4}$d.? Answ. $\frac{81}{320}$.

26. What Part is 2 qrs. 8lb. of a Ct.? Answ. $\frac{4}{7}$.

27. What Part of a Ct. is 4lb. $1\frac{1}{3}$ oz. Avoir-dupois? Answ. $\frac{7}{192}$.

28. What Part of a ib. Troy is 7 pwts. and $3\frac{1}{2}$ Grains? Answ. $\frac{343}{11520}$.

29. What Part of a Yard is 1 qr. $3\frac{1}{2}$ Nails? Answ. $\frac{15}{32}$.

30. What Part of a Ton is 7 Gallons $3\frac{1}{2}$ qrts.? Answ. $\frac{1}{32}$.

31. What Part of a l. is nineteen Shillings and 11 Pence three Farthings? Answ. $\frac{959}{960}$.

CHAP. XV.

Queſtions to exerciſe Fractions, promiſcuouſly ſet down.

1. WHAT Part is 176 of 368? Answ. $\frac{11}{23}$.

2. What Part of $148\frac{4}{5}$ is 124? Answ. $\frac{5}{6}$.

3. What Part is $28\frac{11}{12}$ of $33\frac{2}{42}$? Answ. $\frac{7}{8}$.

4. How many Penny Wts. are in $\frac{5}{8}$ oz. and $5\frac{3}{4}$ pwt. Troy-wt.? Answ. $18\frac{1}{4}$ pwt.

5. What differs $7\frac{3}{4}$d. from $3\frac{1}{3}$s.? Answ. 2s. 8d$\frac{1}{4}$.

6. What will be left if I take $13\frac{5}{6}$s. and $7\frac{5}{8}$d. from 1l. Sterling? Answ. 5s. $6\frac{3}{8}$d.

7. What Number is it, that when added to $\frac{1}{8}$ $\frac{1}{12}$ and $\frac{1}{18}$ together, will make $\frac{25}{37}$? Answ. $\frac{1097}{2664}$.

8. Which of the two is the greater Fraction, $\frac{11}{12}$ or $\frac{15}{16}$? Answ. $\frac{15}{16}$ is greater by $\frac{1}{48}$.

9. Of what Number is 176 the $\frac{11}{13}$ Part? Answ. 208.

10. How much is $\frac{5}{8}$ of $\frac{7}{9}$ of $\frac{3}{4}$ of 20 Shillings? Answ. $7\frac{7}{24}$s.

11. Of what Number is $57\frac{5}{6}$ the $\frac{7}{8}$? Answ. Of $66\frac{2}{21}$.

12. What Number is it, to which if you add $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{8}$ and $\frac{7}{12}$, leſs $\frac{15}{16}$, the Product ſhall be 2? Answ. $\frac{5}{16}$.

13. How often muſt I multiply $\frac{5}{9}$ by $\frac{3}{5}$, that the Product be $\frac{4}{7}$? Answ. $1\frac{5}{7}$ Times.

14. By how much muſt I multiply $13\frac{2}{3}$ that the Product ſhall be $49\frac{1}{5}$? Answ. $3\frac{3}{5}$.

15. How much is $19\frac{5}{8}$s. and $4\frac{1}{2}$d.? Answ. 20s.

16. If the $\frac{5}{6}$ of a l. is 16s. 8d. how many Shillings are in 1l.? Answ. 20s.

17. How much is $\frac{3}{8}$s. and $3\frac{2}{3}$d.? Answ. $8\frac{1}{6}$d.

18. How many Stones, of $1\frac{3}{4}$ Foot long, $\frac{2}{3}$ Foot broad, and $\frac{3}{4}$ Foot thick, are equal to 50 Stones of $3\frac{1}{2}$ Feet long, $2\frac{1}{2}$ Feet broad, $1\frac{1}{7}$ Foot thick? Answ. $571\frac{3}{7}$

19. What will $\frac{1}{3}$ of $\frac{3}{4}$ of 2 pwt. of Silver come to, at 5s. $11\frac{3}{4}$d. the oz.? Answ. $1\frac{127}{160}$d.

20. If 1 Yard of Flanders Lace coſt 9s. $3\frac{3}{4}$d. what will $5\frac{3}{4}$ Yards and 3 Nails come to? Answ. 2l. 15s. $3\frac{33}{64}$d.

21. Find two Numbers, ſo that the $\frac{13}{18}$ of the one will be as much as the $\frac{7}{16}$ of the other? Answ. 126 and 208, &c.

22. A Merchant has $\frac{3}{4}$ Share in a Ship, and ſells $\frac{3}{4}$ of his Intereſt therein for 250l. I demand the

Value of the whole Ship at that Rate? ANSW. 1333l. 6s. 8d.

CHAP. XVI.

The RULE of THREE DIRECT in FRACTIONS.

SECT. I.

Rule.

1. *AS in the Rule of Three, in whole Numbers, ſo likewiſe in Fractions, let your firſt and laſt Number be of one Name.*

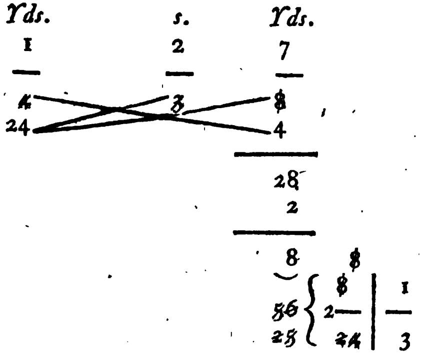
2. *Bring the Denominator of your firſt Number either under the ſecond or laſt Number.*

3. *Bring the Denominator of the ſecond and third Number (being multiplied into one another) under the firſt Number.*

4. *If there be any given mixt Numbers, multiply the Integral Parts by the Denominator, and take in the Numerator, then tranſpoſe the Denominators, as before.*

1. If $\frac{1}{4}$ Yard coſt $\frac{2}{3}$s. what will $\frac{7}{8}$ of a Yard come to? ANSW. $2\frac{1}{3}$s.

Example.



2. How much will $\frac{7}{8}$ of a Yard of Lace come to, if $\frac{1}{4}$ of a Yard coſt $\frac{2}{3}$s.? Answ. $2\frac{1}{3}$s.

3. if $\frac{3}{8}$ of a Yard coſt $\frac{15}{32}$l. what coſt $\frac{2}{3}$ of a Yard? Answ. 16s. 8d.

4. What will $\frac{8}{9}$ lb. coſt, if $\frac{2}{3}$s. buys $\frac{7}{8}$lb.? Answ. $4\frac{92}{105}$d.

— II. —

5. If $2\frac{1}{2}$ gives $3\frac{1}{3}$, what gives $4\frac{3}{4}$? Answ. $6\frac{1}{3}$.

$$\begin{array}{ccccc}
\underline{2\frac{1}{2}} & — & \underline{3\frac{1}{3}} & — & \underline{4\frac{3}{4}}\\
5 & & 10 & & 19\\
\underline{12} & & & & \underline{2}\\
60 & & & & 38\\
 & & & & \underline{10}\\
 & & & & \underbrace{20}\\
 & & & & \left.\begin{array}{r}\cancel{3}\cancel{8}\cancel{0}\\ \cancel{6}\cancel{0}\end{array}\right\} 6\frac{1}{3}
\end{array}$$

6. If $\frac{4}{7}$oz. Avoir-du-pois wt. coſt 10$\frac{1}{2}$d. what coſt $\frac{5}{14}$lb.? Answ. 8s. 9d.

7. If 19$\frac{1}{3}$lb. coſt $\frac{9}{10}$l. what Quantity can I have for $\frac{5}{8}$s.? Answ. $\frac{2}{3}$lb.

8. What will $\frac{1}{2}$ Ct. come to, if 6$\frac{3}{4}$ Ct. coſt 21$\frac{3}{4}$l.? Answ. 1l. 12s. 2$\frac{2}{3}$d.

9. If $\frac{1}{2}$ Ct. coſt 32s. 2$\frac{2}{3}$d. what will 6$\frac{3}{4}$ Ct. come to? Answ. 21$\frac{3}{4}$l.

10. How many Ct. can I have for 21$\frac{3}{4}$l. if $\frac{1}{2}$ Ct. coſt 32s. 2$\frac{2}{3}$d.? Answ. 6$\frac{3}{4}$ Ct.

11. If $\frac{1}{4}$ Ct. coſt 1l. 1$\frac{3}{4}$s. how much can be bought for 38$\frac{1}{4}$s.? Answ. 1qr. 21$\frac{7}{29}$lb.

12. What will 1$\frac{1}{2}$Ct. of Pepper come to, if 15$\frac{1}{4}$lb. coſt 12$\frac{3}{8}$s.? Answ. 6l. 16s. 3$\frac{57}{61}$d.

III.

13. If 1lb. of Silk coſt 16$\frac{2}{3}$s. how many lb. can I have for 37$\frac{1}{2}$s.? Answ. 2$\frac{1}{4}$lb.

Example.

$$\begin{array}{ccccc}
s. & & lb. & & s. \\
16\frac{2}{3} & \text{———} & 1 & \text{———} & 37\frac{1}{2} \\
\hline
50 & & & & 75 \\
2 & & & & 3 \\
\hline
100 & & & & \\
 & & & & \underbrace{25} \\
 & & & & \left.\begin{array}{r} 22\cancel{5} \\ 1\cancel{0}\cancel{0} \end{array}\right\} 2\frac{1}{4}\text{lb.}
\end{array}$$

14. How many lb. of Pot-Aſhes can I have for $12\frac{1}{4}$d. if 1lb. coſt $1\frac{3}{4}$d.? ANSW. 7lb.

15. If 1lb. of Coffee coſt $2\frac{3}{4}$s. how many lb. can I have for $38\frac{1}{2}$s.? ANSW. 14lb.

16. If for $10\frac{1}{3}$s. I buy 1 Hundred of Oranges, how many Hundred can I have for $105\frac{11}{12}$s.? ANSW. $10\frac{3}{4}$ Hundred.

—— IV. ——

17. If 1 Ounce of Silver coſt $5\frac{2}{3}$s. what will $\frac{3}{4}$ of an Ounce come to? ANSW. $4\frac{1}{4}$s.

Example.

$$\begin{array}{ccc}
oz. & s. & oz. \\
1 \text{———} & 5\frac{2}{3} & \text{———} \frac{3}{4} \\
12 & \overline{} & \\
 & 17 & \\
 & 3 & \\
 & \overline{} & \\
 & \underbrace{3} & \\
 & \left.\begin{array}{c} 51 \\ 12 \end{array}\right\} 4\frac{1}{4}s. &
\end{array}$$

18. What will $\frac{1}{4}$ Yard come to, if 1 Yard coſt $13\frac{1}{2}$s.? ANSW. $3\frac{3}{8}$s.

19. If 1lb. of any Thing coſt $5\frac{1}{4}$s. what will $\frac{7}{8}$ lb. come to? ANSW. 4s. $7\frac{1}{8}$d.

20. How much will $\frac{1}{4}$ Ct. come to at the Rate of $15\frac{3}{4}$s. the Ct.? ANSW. 3s. $11\frac{1}{4}$d.

—— V. ——

21. If 1lb. of Spice coſt $\frac{3}{4}$s. how much will $\frac{7}{8}$lb. come to?

$$\begin{array}{ccc} & \textit{s.} & \textit{lb.} \\ \textit{lb.} & 3 & 7 \\ 1\text{———} & \text{—————} & \text{—} \\ 32 & \cancel{4} & \cancel{8} \\ & & 3 \\ & & \overline{} \\ & & 21 \end{array}$$

Answ. $\frac{21}{32}$s. or $7\frac{7}{8}$d.

22. What will $\frac{14}{15}$ of a lb. coſt at the Rate of $\frac{5}{8}$s. the lb.? Answ. 7d.

23. If. 1 Ct. coſt $\frac{8}{9}$l. what will $\frac{3}{4}$ Ct. come to? Answ. $\frac{2}{3}$l. or 13s. 4d.

24. What will half a Pint of Brandy coſt, if a Gallon coſt $\frac{1}{3}$l.? Answ. $\frac{1}{48}$l. or 5d.

—— VI. ——

25. If for $\frac{9}{10}$l. I have 1 Yard of Cloth, how many Yards can I have for $\frac{15}{16}$l.?

$$\begin{array}{ccc} \textit{l.} & \textit{Yd.} & \textit{l.} \\ 9 & & 15 \\ \text{—} & \text{———}1\text{———} & \text{—} \\ \cancel{10} & & \cancel{16} \\ 16 & & 10 \\ \overline{144} & & \overline{6} \end{array}$$

$$\left.\begin{array}{c} \cancel{150} \\ \cancel{144} \end{array}\right\} 1\tfrac{1}{24} \text{ Answ.}$$

26. What will $\frac{5}{8}$lb. coſt, if $\frac{5}{6}$lb. coſt 1l.? Answ. $\frac{3}{4}$l. or 15s.

27. If for $\frac{8}{9}$l. I have 1Ct. how much can I have for $\frac{2}{3}$l.? Answ. $\frac{3}{4}$Ct.

28. How many Ounces can I have for $\frac{8}{9}$s. if 1 Ounce coſt $\frac{2}{3}$s.? ANSW. $1\frac{1}{3}$ oz.

—— VII. ——

29. If $\frac{3}{4}$ of a Yard of Cloth coſt $\frac{2}{3}$l. what will 1 Yard coſt?

$$\begin{array}{ccc}
\textit{Yds.} & \textit{l.} & \\
3 & 2 & \textit{Yd.} \\
\text{—} & \text{—}\text{————} & 1 \\
\cancel{4} & \cancel{3} & \\
\underline{3} & \underline{4} & \\
9 & \multicolumn{2}{l}{\text{Answ. } \frac{8}{9}\text{l. or 17s. } 9\frac{1}{3}\text{d.}}
\end{array}$$

30. What will 1 Yard of any thing coſt, if $\frac{7}{8}$ of a Yard coſt $\frac{14}{15}$l.? ANSW. $1\frac{1}{15}$l.

31. How much will 1lb. coſt if $\frac{2}{3}$lb. coſt $\frac{7}{8}$s.? ANSW. $1\frac{5}{16}$s.

32. If 3 Penny wts. of Silver coſt $\frac{3}{4}$s. what is 1 Ounce worth? ANSW. 5s.

—— VIII. ——

33. If $\frac{5}{6}$ of a lb. coſt 15d. what coſt 1lb.?

$$\begin{array}{ccc}
\textit{lb.} & & \\
5 & \textit{d.} & \textit{lb.} \\
\text{—}\text{————} & 15\text{————} & 1 \\
6 & 6 & \\
 & \overline{} & \\
 & \left.\begin{array}{r}\cancel{4}\\ \cancel{9}\cancel{0}\\ \cancel{5}\cancel{5}\end{array}\right\} & \text{18d. Answ.}
\end{array}$$

34. What will 1 Yard come to, if $\frac{3}{4}$ of a Yard coſt 18d.? ANSW. 24d.

35. If half a Quarter of Flanders Lace coſt 3s. what is that a Yard? Answ. 24s.

36. How much coſts 1lb. of Spice, if $\frac{2}{3}$lb. coſt 7s.? Answ. 10$\frac{1}{2}$s. or 10s. 6d.

—IX.—

37. If 1 Ton of Tallow coſt 35l. what coſts $\frac{3}{4}$ of a Ton?

$$\begin{array}{lll}
 & & \textit{Tons.} \\
\textit{Ton.} & \textit{l.} & 3 \\
1\text{———} & 35\text{———} & \text{—} \\
4\text{———} & \underline{\ 3\ } & 4
\end{array}$$

$$\begin{array}{r} 21 \\ \cancel{1}\cancel{0}\cancel{5} \\ \cancel{4}\cancel{4} \end{array}\left\{\begin{array}{l} \text{l.} \\ 26\tfrac{1}{4}\ \text{Answ.} \\ \end{array}\right.$$

38. How much will half a Quarter of a Yard of Lace come to at 46d. the Yard? Answ. 5$\frac{3}{4}$d.

39. If 1 Ounce of Silver coſt 5s. how much coſts $\frac{5}{8}$ of an Ounce? Answ. 3s. 1$\frac{1}{2}$d.

40. At 25s. per Ct. how much will $\frac{3}{4}$ of a Ct. coſt? Answ. 18s. 9d.

—X.—

41. If 1 Yard of Linen Cloth coſt $\frac{3}{4}$s. what will 1 Piece containing 40 Yards coſt? Answ. 30s.

$$\begin{array}{lll}
 & \textit{s.} & \\
\textit{Yd.} & 3 & \textit{Yds.} \\
1\text{———} & \text{—}\ \text{———} & 40 \\
4 & 4 & \underline{\ \ 3\ \ }
\end{array}$$

$$\begin{array}{r} 1\cancel{2}\cancel{0} \\ \cancel{4}\cancel{4} \end{array}\left\{ 30\text{s.} \right.$$

42. What will 7lb. of Cloves coſt, if 1lb. coſt $\frac{3}{10}$l. ? Answ. 2l. 2s.

43. At $\frac{5}{6}$l. per Yard, how much will 42 Yards coſt? Answ. 35l.

44. If 1lb. of Sugar coſt $\frac{2}{3}$s. how much will 28lb. coſt? Answ. 18s. 8d.

—— XI. ——

45. If 1 Yard of Cloth coſt 6$\frac{2}{3}$s. how much will 789 Yards come to? Answ. 263l.

1 ——— 6$\frac{2}{3}$ ——— 789

3 — 20 — 20

$$\begin{array}{r} 1 \\ \cancel{15780} \\ \cancel{3333} \end{array} \left\{ \begin{array}{l} 526 \mid 0 \\ \hline 263\text{l.} \end{array} \right.$$

46. What will 756lb. of Indigo come to at 3$\frac{1}{3}$s. the lb.? Answ. 126l.

47. If 1lb. of Cotton coſt 8$\frac{1}{4}$d. what will 112lb. come to? Answ. 3l. 17s.

48. How much will 650lb. come to at 3$\frac{3}{4}$s. the lb.? Answ. 121l. 17s. 6d.

—— XII. ——

49. How much will $\frac{1}{2}$ of $\frac{3}{4}$ Yards coſt, if $\frac{4}{9}$ Yards coſt $\frac{7}{8}$ Ducatoons of 6s. each? Answ. 4s. 5$\frac{5}{32}$d.

50. If 3 Times $\frac{5}{6}$ Yards coſt 4 Times $\frac{2}{3}$s. what will 5 Times $\frac{3}{4}$ Yards coſt? Answ. 4s.

51. What will $\frac{1}{4}$, $\frac{1}{6}$, and $\frac{3}{8}$, leſs $\frac{1}{3}$ lb. come to, if $\frac{7}{8}$, $\frac{3}{4}$, and $\frac{5}{8}$ leſs $\frac{5}{7}$ lb. coſt $\frac{1}{2}$, $\frac{2}{3}$, $\frac{1}{4}$, and $\frac{7}{8}$, leſs $1\frac{15}{16}$. Crowns at 5s. 5d. per piece? ANSW. $12\frac{59}{1068}$d.

52. A Merchant buys $37\frac{3}{4}$ Ps. of Cloth at $23\frac{1}{2}$l. the Piece, pays in ready Money $235\frac{1}{4}$l. and the reſt he is to pay in Wool at the Rate of $7\frac{2}{3}$s. the Stone. I demand how many Stone of Wool he muſt deliver? ANSW. $1700\frac{25}{46}$ Stone.

53. Two Ps. of Cloth containing both together $79\frac{3}{4}$ Yards, I demand how many Yards are in each Piece, if $\frac{2}{3}$ Yards of the one are as long as $\frac{3}{4}$ Yards of the other? ANSW. $42\frac{15}{68}$ and $37\frac{9}{17}$ Yards.

54. How much will 2 Bags of Wool come to, No. 1, wt. $94\frac{3}{16}$ Stone, No. 2, wt. $305\frac{7}{8}$ Stone, at 10s. $6\frac{2}{3}$d. per Stone, but $4\frac{2}{3}$ Stone of No. 2, are worth but $2\frac{1}{4}$ Stone of No. 1.? ANSW. 127l. 10s. $4\frac{59}{64}$d.

PRACTICE

PRACTICE TABLE.

Parts of a *l.*

d.
10 : 0 are $\frac{1}{2}$
6 : 8 — $\frac{1}{3}$
5 : 0 — $\frac{1}{4}$
4 : 0 — $\frac{1}{5}$
3 : 4 — $\frac{1}{6}$
2 : 6 — $\frac{1}{8}$
2 : 0 — $\frac{1}{10}$

Of a Shilling.

d.
6 are $\frac{1}{2}$
4 — $\frac{1}{3}$
3 — $\frac{1}{4}$
2 — $\frac{1}{6}$
$1\frac{1}{2}$ — $\frac{1}{8}$
1 — $\frac{1}{12}$

Parts of a *Ct.*

lb.
56 are $\frac{1}{2}$
28 — $\frac{1}{4}$
16 — $\frac{1}{7}$
14 — $\frac{1}{8}$
8 — $\frac{1}{14}$
7 — $\frac{1}{16}$
4 — $\frac{1}{28}$

Of a $\frac{1}{2}$ *Ct.*

lb.
28 are $\frac{1}{2}$
14 — $\frac{1}{4}$
8 — $\frac{1}{7}$
7 — $\frac{1}{8}$

Of a $\frac{1}{4}$ *Ct.*

lb.
14 are $\frac{1}{2}$
7 — $\frac{1}{4}$
4 — $\frac{1}{7}$
$3\frac{1}{2}$ — $\frac{1}{8}$

CHAP. XVII.

PRACTICE.

SECT. I.

1. IF 1 Hundred of Butter coſt 25s. 6d. what will $\frac{1}{2}$ a Hundred come to? ANSW. 12s. 9d.

Example.

s. *d.*
25 : 6
½ ―――――
12s. 9d.

2. What will ¼ of a Ct. come to, at the Rate of 29s. 6d. per Ct.? Answ. 7s. 4½d.

3. If 1 Yard of Cloth coſts 8s. 6d. what will ½ a Yard coſt? Answ. 4s. 3d.

4. How much will 14lb. of Sugar coſt, at the Rate of 45s. 6d. per Ct.? Answ. 5s. 8¼d.

5. What will 7lb. be worth, if 1 Ct. coſt 36s. 4d.? Answ. 2s. 3¼d.

6. How much is ⅛ Part of 2000l. 11s. 8d.? Answ. 250l. 1s. 5½d.

―― II. ――

7. If 1 Ct. of Madder coſt 50s. what will ¾ Ct. be worth? Answ. 1l. 17s. 6d.

Example.

l. *s.*
2 : 10
¾
―――――
2 qrs. are ½ — 1 : 5 : 0
1 qr. is ½ — 0 : 12 : 6
―――――
£. 1 : 17 : 6

8. What will 2 qrs. 14lb. come to, if 1 Ct. coſt 50s.? Answ. 1l. 11s. 3d.

9. If 1 Ct. coſt 46s. 6d. what coſt 1 qr. 14lb. Answ. 17s. 5¼d.

10. At 17l. 10s. 8d. the Ton, what will 3 Ct. 3qrs. coſt? Answ. 3l. 5s. 9d.

11. If 1lb. of Silk coſt 3l. 10s. how much will 12 oz. coſt? Answ. 2l. 12s. 6d.

12. What will 3qrs. 21lb. of Tallow come to, at the Rate of 27s. 8d. per Ct.? Answ. 1l. 5s. 11¼d.

—— III. ——

13. If 1lb. of Cloves coſt 9s. 4d. what is an Ounce worth? Answ. 3½d.

Example.

s. *d.*
9 : 4

½ oz. is $\frac{1}{32}$lb. 0 : 3½d.

14. What will 3½lb. of Sugar come to, at the Rate of 14s. 4d. the ¼ of a Ct.? Answ. 1s. 9½d.

15. If 1 Yard of Flanders Lace coſt 15s. 4d. what coſt 1 Nail? Answ. 11½d.

16. How much will ¾ of an Ounce Avoir-du-pois come to, if 1lb. be worth 9s. 4d.? Answ. 5¼d.

17. At 23s. 4d. per Ct. what is ½ of a lb. worth? Answ. 1¼d.

18. At 18s. 8d. per Hundred, what comes ¾ of a lb. to? Answ. 1½d.

19. What will ½lb. coſt, at the Rate of 9s. 4d. per Ct.? Answ. ½d.

20. If an Ounce of Gold be worth 4l. what is that a Grain? Answ. 2d.

—— IV. ——

21. At 4d. per lb. what will 112lb. come to? Answ. 1l. 17s. 4d.

Example.

lb.
112
d.
4 is $\frac{1}{3}$ 3|7 : 4
£. 1 : 17 : 4

Or Thus.
lb.
112
d.
4 is $\frac{1}{60}$ | . 1 : 17 : 4

22. What will 379lb. of Sugar come to, at the Rate of 6d. per lb.? Answ. 9l. 9s. 6d.

23. If 1 Yard coſt 3d, what would 5014 Yards coſt? Answ. 62l. 13s. 6d.

24. How much will 758 Yards come to, at 2d. the Yard? Answ. 6l. 6s. 4d.

25. How much will 112lb. come to, at 1½d the lb.? Answ. 14s.

26. What will 976lb. come to, at 1d. per lb.? Answ. 4l. 1s. 4d.

—— V. ——

27. If 1 Pound of any thing coſt 5d. what will 1 Ct. be worth? Answ. 2l. 6s. 8d.

Example.

lb.
112

d.
4 is $\frac{1}{3}$ - 37 : 4
1 is $\frac{1}{4}$ - 9 : 4

4|6 : 8

£. 2 : 6 : 8

Or Thus.
112

d.
5 is $\frac{1}{48}$*d.* of a *l.* 2 : 6 : 8

28. How much would 563 Yards coſt, at 7d. the Yard? Answ. 16l. 8s. 5d.

29. How much will 112lb. come to, at 8d. the lb.? Answ. 3l. 14s. 8d.

30. If 1lb. coſt 10d. how much would 795lb. coſt? Answ. 33l. 2s. 6d.

31. At 11d. the Yard, how much coſt 7576 Yards? Answ. 347l. 4s. 8d.

32. If 1lb. of Tanned Leather coſt 6$\frac{1}{2}$d. what coſt 94 Hides, weight 1000lb.? Answ. 27l. 1s. 8d.

—— VI. ——

33. If 1lb. of any Thing coſt 1s. 3d. what will 9654lb. come to? Answ. 603l. 7s. 6d.

Example.

lb.
d. 9654
3 is $\frac{1}{4}$s. 2413 : 6

1206|7 : 6

Or Thus.
9654

d.
15 is $\frac{1}{16}$ of a l. 603 : 7 : 6

34. At 4s. the Ell, how much coſt 7839 Ells? Answ. 1567l. 16s.

35. If 1lb. of any Thing coſt 2s. 6d. what will 7753lb. coſt? Answ. 969l. 2s. 6d.

36. What will 9654 Yards come to, at 3s. 4d. per Yard? Answ. 1609l.

37. How much will 500 Barrels of Barley come to, at the rate of 6s. 8d. per Barrel? Answ. 166l. 13s. 4d.

—— VII. ——

38. If 1 Hundred of Merchandize coſt 7s. how much will 4563 Ct. come to? Answ. 1597l. 1s.

Example.

	Ct.	*Or Thus.*
	4563	4563
s.		7
5 is $\frac{1}{4}$ -	1140 : 15	
2 is $\frac{1}{10}$ -	456 : 6	3194|1
	£. 1597 : 1	£. 1597 : 1

39. How much will 3215 Ells come to, at 6s. the Ell? Answ. 964l. 10s.

40. What will 7563lb. coſt, if 1lb. coſt 8s.? Answ. 3025l. 4s.

41. How much will 401 Ct. come to, at 13s. per Ct.? Answ. 260l. 13s.

42. If 1Ct. coſt 16s. how much will 269Ct. come to? Answ. 215l. 4s.

43. What coſt 2369Ct. at 19s. per Ct.? Answ. 2250l. 11s.

—— VIII.

— VIII. —

44. If one Yard of Cloth coſts 19s. 9d. what will 1400 Yards coſt? ANSW. 1382l. 10s.

Example.

1400
19:9d.

12600
d. 1400
6 is $\frac{1}{2}$ - 700
3 is $\frac{1}{2}$ - 350

2765|0

£.1382:10

Or thus.
1400
3d. is $\frac{1}{80}$ of a l. 17:10

£.1382:10

45. How much will 4563lb. come to, at 4s. 9d. the lb.? ANSW. 1083l. 14s. 3d.

46. How much will 112lb. coſt, at 6s. 9d. the lb.? ANSW. 37l. 16s.

47. How much will 120Ct. coſt, at 12s. 3d. per Ct.? ANSW. 73l. 10s.

48. If 1 lb. of Mace coſts 15s. 7d. what will 1 Ct. coſt? ANSW. 87l. 5s. 4d.

— IX. —

49. If 1lb. of Silk coſts 3l. 15s. what will 5$\frac{3}{4}$ Ounces coſt? ANSW. 1l. 6s. 11$\frac{7}{16}$d.

Example.

Example.

			l.	*s.*	
			3	15	
4 oz. is ¼	-	-	0	18	9
1 — is ¼	-	-	0	04	8¼
½ — is ½	-	-	0	02	4⅛
¼ — is ½	-	-	0	01	2$\frac{1}{16}$
			£.1	06	11$\frac{7}{16}$ or ½d.

(near enough for Use.

Note. *In theſe and the like Caſes, Merchants take no Notice of ſuch ſmall Parts of a Penny as* $\frac{1}{8}$ *or* $\frac{1}{16}$*, nor is it fit for Uſe. Therefore to be ſhort, and to avoid unneceſſary Work, one may, wherever the Fraction is leſs than a ¼d. put nothing; and if leſs than an ½d. put a ¼d. and if leſs than ¾d. put a ½d. and if leſs than* 1*d. put ¾d. not that I give this to the Learner as a Precedent for the Queſtions here propoſed; but that when he comes into Buſineſs he ſhall not be tedious to himſelf or his Maſter. However the Perfectneſs of the Art which I aimed to inſtruct youth in, requires that every queſtion ſhould be reſolved without the leaſt Fault.*

50. What will 7⅞ oz. of Spice come to, if 12s. 8d. are paid for 1 lb.? Answ. 6s. 2$\frac{13}{16}$d.

51. How much would 21 lb. of Sugar coſt, at the Rate of 54s. 4d. the Ct.? Answ. 10s. 2¼d.

52. If 1 Ct. of Madder coſt 47s. 6d. what will 7½ lb. come to? Answ. 3s. 2$\frac{19}{112}$d.

53. What will 14¾ lb. come to, if 1 Ct. coſt 27l. 10s. 6d.? Answ. 3l. 12s. 5$\frac{221}{224}$d.

54. How much will 11 lb. and ¾ of any Thing come to, at 7s. 6d. the ¼ Ct.? Answ. 3s. 1$\frac{43}{56}$d.

X.

— X. —

55. What will $245\frac{1}{2}$lb. of any Thing come to, at 3s. 6d. the Pound? Answ. 42l. 19s. 3d.

Example.

lb.		*Or thus.*	
	$245\frac{1}{2}$		$245\frac{1}{2}$
	3s. 6d.		3s. 6d.
2s. 6d. is $\frac{1}{8}$	30 : 12 : 6	d.	735
1s. - is $\frac{1}{2}$	12 : 5 : 0	6 is $\frac{1}{2}$	122 : 6
$\frac{1}{2}$lb. cost -	0 : 1 : 9	$\frac{1}{2}$lb. cost	1 : 9
	£.42 : 19 : 3		85'9 : 3
			£.42 : 19 : 3

56. What cost 14Ct. 3qrs. of any Thing, at 16s. 4d. per Ct.? Answ. 12l. 0s. 11d.

57. If 1Ct. costs 18s. $6\frac{1}{2}$d. how much will 101Ct. 1qr. come to? Answ. 93l. 17s. $4\frac{1}{8}$d.

58. What will 193Ct. 3qrs. cost, at the Rate of 17s. $9\frac{1}{2}$d. per Ct.? Answ. 172l. 7s. $1\frac{5}{8}$d.

59. What cost 203Ct. 3qrs. of any Thing, at 16s. $5\frac{1}{4}$d. per Ct.? Answ. 167l. 9s. $1\frac{11}{16}$d.

60. What will $296\frac{1}{4}$lb. of Indigo come to, at 5s. 6d. per lb.? Answ. 81l. 9s. $4\frac{1}{2}$d.

61. If 1 doz. of Candles cost 3s. 3d. what will a Box, qt. $5\frac{1}{2}$ dozen come to? Answ. 17s. $10\frac{1}{2}$d.

— XI. —

62. If 1 Hundred of Butter cost 18s. 9d. what will 106Ct. 3qrs. 14lb. come to? Answ. 100l. 3s. $10\frac{7}{8}$d.

Example.

Ct. qrs. lb.
106 : 3 : 14
18 : 9

848
106
6d. is $\frac{1}{2}$s. - - 53
3d. is $\frac{1}{2}$ - - - 26 : 6
2qrs. is $\frac{1}{2}$Ct. - - 9 : 4$\frac{1}{2}$
1qr. is $\frac{1}{2}$ - - - 4 : 8$\frac{1}{4}$
14lb. is $\frac{1}{2}$ - - - 2 : 4$\frac{1}{8}$

200|3 : 10$\frac{7}{8}$

£. 100 : 3 : 10$\frac{7}{8}$

63. What will 2061Ct. 2qrs. 7lb. coſt, at 16s. 6d. per Ct.? Answ. 1700l. 15s. 9$\frac{3}{8}$d.

64. What will 106Ct. 3qrs. 14lb. come to at 9s. 4d. per Ct.? Answ. 49l. 17s. 6d.

65. If 1Ct. coſts 15s. 9d. how much will 26Ct. 2qrs. 7lb. come to? Answ. 20l. 18s. 4$\frac{5}{16}$d.

66. If 1Ct. coſts 21s. 6d. how much will 306Ct. 2qrs. 21lb. come to? Answ. 329l. 19s. 1$\frac{7}{8}$d.

67. If 1oz. of Silver coſts 5s. 6d. how much will 10lb. 6pwt. 14grs. coſt? Answ. 33l. 1s. 9$\frac{29}{40}$d.

—— XII. ——

68. What will 432 Ct. 2qrs. 22 lb. come to, at the Rate of 18s. 6d. per Ct.? Answ. 400l. 4s. 10$\frac{17}{28}$d.

Example.

Ct. qrs. lb.
432 : 2 : 22
18s. 6d.

3456
432

6d.	is $\frac{1}{2}$s.	-	216
2qrs.	is $\frac{1}{2}$	- -	9 : 3
14lb.	is $\frac{1}{4}$	- -	2 : $3\frac{3}{4}$
7lb.	is $\frac{1}{2}$	- -	1 : $1\frac{}{8}$
1lb.	is $\frac{1}{7}$	- -	0 : $1\frac{55}{56}$

800|4 : $10\frac{17}{28}$

£.400 : 4 : $10\frac{17}{28}$

69. What will 951Ct. 2qrs. 27lb. coſt, at 11s. 3d. per Ct.? Answ. 535l. 7s. $1\frac{5}{112}$d.

70. What will 506Ct. 1qr. 11lb. come to, at 13s. 7d. per Ct.? Answ. 343l. 17s. $10\frac{85}{112}$d.

71. What will 499Ct. 3qrs. 25lb. coſt, at 25s. 11d. per Ct.? Answ. 647l. 17s. $7\frac{75}{112}$d.

72. At 19s. 6d. per Ct. how much will 109Ct. 0qr. 15lb. come to? Answ. 107l. 15s. $4\frac{83}{112}$d.

73. If 1Ct. coſt 15s. 2d. what will 753Ct. 1qr. 25lb. come to? Answ. 571l. 7s. $8\frac{1}{8}$d.

74. If 1lb of Silk coſt 3l. 6s. 5d. what will 80lb. 10 oz. coſt? Answ. 267l. 14s. $10\frac{1}{8}$d.

75. How much will 1095Ct. 0qr. 5lb. come to, at the Rate of 17s. 6d. per Ct.? Answ. 958l. 3s. $3\frac{3}{8}$d.

76. What will 231Ct. 0qr. 1lb. come to, if 1Ct. coſt 18s. 3d.? Answ. 210l. 15s. $10\frac{107}{112}$d.

77. If 1lb. of Silver coſt 3l. 4s. what will 100lb. 11 oz. come to? Answ. 322l. 18s. 8d.

78. If 1 Ton of Butter coſt 19l. 19s. 6d. how much will 20 Tons 19Ct. 3qrs. 14lb. come to? Answ. 419l. 7s. $0\frac{3}{80}$d.

79. What will 10 Tons 17Ct. 3qrs. come to, at 25l 10s. 9d. the Ton? Answ. 278l. 0s. $9\frac{39}{80}$d.

80. What will 7 Yards, 3qrs. and ½qr. come to, at 6s. 9d. the Yard? Answ. 2l. 13s. $1\frac{7}{8}$d.

81. If 1 Ton coſt 21l. 15s. 6d. what coſt 25 Tons, 15Ct. 3qrs. 14½lb.? Answ. 561l. 13s. $3\frac{681}{2240}$d.

82. What will 15 Yards 1½ Quarter of Cloth coſt, if 1 Piece containing 42 Yards, coſt 38l. 17s. 6½d.? Answ. 14l. 4s. $7\frac{141}{222}$d.

83. If 1Ct. coſt 19s. 11¾d. what will 11Ct. 3qrs. 27½lb. come to? Answ. 11l. 19s. $7\frac{161}{224}$d.

84. What will 19 Tons, 19Ct. 3qrs 27½lb. come to, at 19l. 19s. 11¾d. the Ton? Answ. 399l. 19s. $5\frac{16641}{17920}$d.

CHAP. XVIII.

TRET AND TARE.

ACCORDING *to the Cuſtom of the City of* Cork, *the Merchants allow* 1 *per* Ct. *that is,* 1lb. *out of every* 112lb. *to be deducted from the Groſs Weight of all Sorts of Merchandizes, except for Wool, Beef, Butter and Hides; and this they call Tret.*

For Wool they deduct 8lb. *for every* 20 *Stones, after the Tare is deducted.*

For Butter they allow 2lb. *at the Beam for every large Caſk.*

For raw Hides 4lb. *per Piece.*

For Beef 8lb. *per Carcaſe.*

N. B. *TARE is the Weight of Caſks, Bags, or whatever elſe the Goods are put in, the Weight whereof is often marked or branded on the outſide of it.*

S E C T. I.

1. BOUGHT 100 Carcaſſes of Beef, wt. groſs 450Ct. 2qrs. 23lb. Tret 8lb. per Carcaſs, and at 8s. 6d. per Ct. what is the neat wt. and what does it amount to? ANSW. 188l. 10s. 3⅛d.

Example.

		Ct. qrs. lb.	
Groſs	-	450 : 2 : 23	100 Carcaſſes
Tret	-	7 : 0 : 16	8
Neat	-	443 : 2 : 7	16 ~~800~~ ~~112~~ } *Ct. qr. lb.* 7 : 0 : 16
		at 8s. 6d. per Ct.	
		3544	
6d. is ½	-	221 : 6	
2qrs. is ½	-	4 : 3	
7lb. is ⅛	-	0 : 6⅜	
		377|0 : 3⅜	

ANSW. £.188 : 10 : 3⅜

2. What will 400 raw Hides come to, wt. groſs 306Ct. 3qrs. 15lb. Tret 4lb. per Hide, and at 19s. 10d. per Ct.? ANSW. 200l. 3s. 2³⁄₀d.

3. If 1Ct. of Butter coſt 21s. 6d. what will 250 Firkins coſt, wt. groſs 127Ct. 2qrs. 21lb. Tare 11lb. per Firkin? Answ. 110l. 17s. $4\frac{31}{56}$d.

4. Sold 10 Caſks of Merchandizes, wt. groſs, 33 Ct. 2qrs. 15lb. Tare 15lb. per Caſk, and at 23s. 4d. per Ct. what does it come to? Answ. 37l. 13s. $6\frac{1}{2}$d.

5. Bought 150 large Caſks of Butter, weight groſs, 206Ct. 3qrs. 24lb. Tare 30lb. per Caſk, and at 24s. 6d. per Ct. I demand what it comes to? Answ. 204l. 6s. 3d.

—— II. ——

6. Two Hhds. of Tallow weigh as follow, No. 1, wt. groſs, 10Ct. 1qr. 11lb. Tare, 3qrs. 20lb. No. 2, 11Ct. 0qrs. 17lb. Tare, 3qrs. 14lb. Tret 1 per Ct. out of the groſs, and at 30s. per Ct. what do they come to? Answ. 29l. 5s. $1\frac{17}{28}$d.

Example.

	Ct. qr. lb.		*Ct. qrs. lb.*
No. 1, wt.	10 : 1 : 11	Tare	0 : 3 : 20
No. 2, wt.	11 : 0 : 17	- - -	0 : 3 : 14
groſs,	21 : 2 : 00		1 : 3 : 6
1 per Ct. Tret,	0 : 0 : $21\frac{1}{2}$		
	21 : 1 : $6\frac{1}{2}$		
Tare,	1 : 3 : 6		
Neat	19 : 2 : $0\frac{1}{2}$		
at	30s. per Ct.		
	570		
2qrs. is $\frac{1}{2}$	15		
$\frac{1}{2}$lb. is $\frac{1}{112}$	0 : $1\frac{17}{28}$		
	58|5 : $1\frac{17}{28}$		

Answ. £. 29 : 5 : $1\frac{17}{28}$

7. Sold 4 Hhds. of Sugar, weighing as follow: No. 1, wt. 7Ct. 3qrs. 16lb. Tare, 3qrs. 20lb. No. 2, 8Ct. 0qrs. 10lb. Tare, 3qrs. 24lb. No. 3, 7Ct. 2qrs. 26lb. Tare, 3qrs. 27lb. No. 4, 8Ct. 2qrs. 18lb. Tare, 3qrs. 25lb. Tret, 1 per Ct. and at 35s. 4d per Ct. how much do they amount to? Answ. 49l. 17s. 5,$\frac{1}{12}$d.

8. A Merchant has bought 4 Hhds. of Copperas, Weight as follows, viz. No. 1, 10Ct. 2qrs. 4lb. Tare, 3qrs. 4lb. No. 2, 11Ct. 0qr. 10lb. Tare, 3qrs. 10lb. No. 3, 12Ct. 1qr. 0lb. Tare, 3qrs. 14lb. No. 4, 11Ct. 2qrs. 14lb. Tare, 3qrs. 18lb. Tret, 1 per Ct. and at 18s. 6d. per Ct. how much do they come to? Answ. 17l. 14s. 3$\frac{75}{112}$d.

9. Four Caſks of Raiſins, Weight as follows, No. 1, 1Ct. 3qrs. 25lb. Tare, 0qr. 21lb. No. 2, 1Ct. 3qrs. 20lb, Tare, 0qr. 24lb. No. 3, 2Ct. 1qr. 20lb. Tare, 0Ct. 1qr. 3lb. No. 4, 1Ct. 3 qrs. 23lb. Tare, 0Ct. 0qr. 25lb. Tret, 1 per Ct. and at 30$\frac{1}{3}$s. per Ct. what do they amount to? Answ. 11l. 0s. 7$\frac{15}{16}$d.

10. What will 3 Bales of Coffee come to, No. 1, wt. 2Ct. 3qrs. 12lb. Tare, 16lb. No. 2, 3Ct. 1 qr. 20lb. Tare, 19lb. No. 3, 3Ct. 1qr. 24lb. Tare, 18lb. Tret, 1lb. per Ct. and at 18l. 10s. per Ct.? Answ. 170l. 0s. 2$\frac{23}{56}$d.

—— III. ——

11. What will 2 Bags of Merchandizes come to, No. 1, wt. 2Ct. 3qrs. 10lb. No. 2, 3Ct. 2qrs. 18 lb. Tret, 1 per Ct. Tare, 16lb. per Bag, and at 1s. 8d. per lb? Answ. 57l 9s 2d.

Example.

	Ct. qrs. lb.	*lb.*
No. 1,	2 : 3 : 10	Tare, 16
2,	3 : 2 : 18	16
	6 : 2 : 00	32 is 1qr. & 4lb.
Tret,	0 : 0 : 6½	
	6 : 1 : 21½	
Tare,	0 : 1 : 4	
Neat, - -	6 : 0 : 17½	
	112	
	689½ at 1s. 8d. per lb.	
6d. is ½	344 : 6	
2d. is ⅓	114 : 10	
½lb. coſt	0 : 10	
	114|9 : 2	
	£. 57 : 9 : 2	

12. A Merchant has ſold 3 Bags of Pepper, *viz.* No. 1, weighing 3Ct. 2qrs. 0lb. No. 2, 4Ct. 1 qr. 7lb. No. 3, 3Ct. 3qrs. 21lb. Tret, 1 per Ct. and Tare 40lb. for each Bag, and at 14¾d. per lb. neat, I demand how much it will come to? Answ. 72l. 15s. 7$\frac{11}{16}$d.

13. Sold 4 Caſks of Indigo, wt. groſs 18Ct. 2qrs. 0lb. Tret, 1 per Ct. Tare, 37lb. per Caſk, and at 4s. 6d. per lb. what do they amount to? Answ. 428l. 14s. 9d.

14. Twelve Caſks of Merchandizes, wt. 306Ct. 3qrs. 0lb. Tret, 1 per Ct. Tare, 35lb. per Caſk, and at 15$\frac{1}{2}$d. per lb. what do they amount to? Answ. 2171l. 17s. 9$\frac{3}{8}$d.

15. Three Bags of Cocoa, wt. groſs, 10Ct. 1 qr. 14lb. Tret, 1 per Ct. Tare, 7lb. per Bag, and at 9$\frac{1}{4}$d. per lb. what do they come to? Answ. 45l. 18s. 7$\frac{19}{32}$d.

16. What will 4 Hhds. of Tallow come to, No. 1, wt. 9Ct. 3qrs. 24lb. No. 2, wt. 10Ct. 2qrs. 16lb. No. 3, wt. 11Ct. 0qrs. 12lb. No. 4, wt. 9Ct. 3qrs. 4lb. Tret, 1 per Ct. and Tare, 3qrs. 6 lb. per Hhd. and at 20l. 10s. per Ton? Answ. 38l. 17s. 3$\frac{15}{112}$d.

—— IV. ——

17. Bought 3 Packs of Wool, wt. *viz.* No. 1, 3Ct. 1qr. 12lb. No. 2, 3Ct. 3qrs. 7lb. No. 3, 3Ct. 2qrs. 15lb. Tare, 30lb. per Pack, and Tret, 8lb. per every 20 Stone, and at 10s. 6d. per Stone, what do they come to? Answ. 35l. 16s. 7$\frac{1}{2}$d.

Example.

	Ct.	qrs.	lb.		lb.
No. 1 - -	3	1	12	Tare,	30
2 - -	3	3	7		30
3 - -	2	2	15		30
	10	3	6		90 are 3 qrs. (6lb.
Tare,	0	3	6		
	10	0	0		

7

Stone, lb.
If 20 - 8 70 come 28lb. is 1 Stone 12lb.
Tret, 1 : 12

68 : 4
at 10 : 6d. per Stone,

680
6d. is $\frac{1}{2}$ - - 34
4lb. is $\frac{1}{4}$ - - 2 : $7\frac{1}{2}$

716 : $7\frac{1}{2}$

ANSW. £. 35 : 16 : $7\frac{1}{2}$

18. Sold 4 Packs of Wool, at 9s. 9d. per Stone, weighing, *viz.* No. 1, 3Ct. 3qrs. 27lb. No. 2, 3Ct 2qrs. 16lb. No. 3, 4Ct. 1qr. 10lb. No. 4, 4Ct. 0qrs. 6lb. Tare, 30lb. per Pack, and Tret, 8lb. for every 20 Stone. I demand what they come to? ANSW. 49l. 15s. $2\frac{20}{21}$d.

19. Bought 5 Packs of Wool, weight, *viz.* No. 1, 4Ct. 2qrs. 15lb. No. 2, 4Ct. 2qrs. 0lb. No. 3, 3Ct. 3qrs. 21lb. No. 4, 3Ct. 3qrs. 14lb. No. 5, 4Ct. 0qrs. 14lb. Tare, 28lb. per Pack, Tret, 8lb. per every 20 Stone, and at 11s. 6d. per Stone, how much do they come to? ANSW. 77l. 15s. $8\frac{13}{16}$d.

20. Sold 3 Packs of Wool, Weight as follows: No. 1, 3Ct. 1qr. 27lb. No. 2, 3Ct. 2qrs. 16lb. No. 3, 4Ct. 0qrs. 21lb. Tare, 29lb. per Pack, Tret, 8lb. for every 20 Stone, and at 11s. 7d. per Stone, what do they come to? ANSW. 41l. 13s. $7\frac{281}{640}$d.

— V. —

Of Tares and Allowances per Hundred wt.

21. Fifty Caſks of Butter, Weight groſs 202Ct. 3qrs. 14lb. Tare, 20 per Ct. (that is 20lb. out of every 112lb.) what is the neat Weight? ANSW. 166Ct. 2qrs. 16½lb

Example.

```
               Ct.  qrs.  lb.                 Ct.   qrs.   lb.
               202 : 3 : 14         Groſs,  202  :  2  :  14½
                20                  Tare,    36  :  0  :  25½
            ----------                      -------------------
              4040                  Neat,   166  :  2  :  16½
2qrs. is ½      10
 1qr. is ½       5
14lb. is ½       2½
            ----------
            4087½ ⎧ Ct.   qrs.   lb.
            1122  ⎨ 36  :  0  :  25½
              11  ⎩
```

22. Ten Hhds. of Tallow, wt. groſs 104Ct. 2 qrs. 25lb. Tare, 14 per Ct. what are they neat? Answ. 91Ct. 2qrs. $14\frac{7}{8}$lb.

23. Six Buts of Currants, wt. groſs 58Ct. 1qr. 18lb. Tare, 16 per Ct. what are they neat? Answ. 50Ct. 0qrs. $7\frac{3}{8}$lb.

24. Four Hhds. of Sugar, wt. 43Ct. 3qrs. 21lb. Tare, 12 per Ct. what are they neat? Answ. 39 Ct. 0qrs. $25\frac{3}{4}$lb.

25. Three Cheſts of Sugar, wt. groſs, 36Ct. 1 qr. 19lb. Tare 18lb. per Ct. what are they neat? Answ. 32Ct. 2qrs. $22\frac{5}{14}$lb.

26. Five Hhds. of Madder, wt. groſs, 36Ct. 1 qr. 19lb. Tare, 14 per Ct. what are they neat? Answ. 31Ct. 3qrs. $13\frac{1}{8}$lb.

27. Eight Bags of Pepper, wt. 21Ct. 3qrs. 13lb. Tare, 4 per Ct. what are they neat? Answ. 21Ct. 0qrs. $9\frac{5}{48}$lb.

C H A P. XIX.

E X C H A N G E.

S E C T. I.

To reduce *Engliſh* Money into *Iriſh*.

A Merchant in *Ireland*, draws a bill of Exchange for 150l. *Engliſh* Money, which he negociates to a Banker, at 5 per Ct. advance, how much *Iriſh* Money is he to receive? Answ. 157l. 10s.

Example.

£. 150	£. 150 : 0 : Engliſh,
5	7 : 10 : Exchange,
7|50	£. 157 : 10 : Iriſh.
20	
10|00	

270l. Engliſh, at 7 per Ct. how much Iriſh? Answ. 288l. 18s.

370l. Engliſh, at 9 per Ct. how much Iriſh? Answ. 403l. 6s.

510l. at 8 per Ct. what will it come to? Answ. 550l. 16s.

955l. at 6 per Ct. what is it? Answ. 1012l. 6s.

265l. at 4 per Ct. how much is it? Answ. 275l. 12s.

—II.—

190l. 17s. 10d. Engliſh Money, at 5 per Ct. how much Iriſh is it? Answ. 200l. 8s. $8\frac{7}{10}$d.

Example.

l.	*s.*	*d.*		
190 :	17 :	10		£. 190 : 17 : 10 Engliſh.
		5		9 : 10 : $10\frac{7}{10}$ Exchange.
£. 9|54 :	9 :	2		200 : 8 : $8\frac{7}{10}$ Iriſh.
20				
s. 10|89				
12				
d. 10|70	7			
100	10			

750l. 18s. 8d. at 7 per Ct. how much is it? Answ. 803l. 9s. 11$\frac{17}{25}$d.

901l. 1s. 11d. at 8 per Ct.? Answ. 973l. 3s. 8$\frac{1}{25}$d.

300l. 15s. 6d. at 9 per Ct.? Answ. 327l. 16s. 10$\frac{37}{50}$d.

199l. 19s. 11d. at 11 per Ct.? Answ. 221l. 19s. 10$\frac{89}{100}$d.

999l. 19s. 9d. at 3 per Ct.? Answ. 1029l. 19s. 8$\frac{91}{100}$d.

—— III. ——

280l. English at 6½ per Ct. advance, how much Irish is it? Answ. 298l. 4s. 0d.

Example.

```
£. 280
     6½
 ------
   1680
    140
 ------
£. 18|20
      20
 ------
s.  4|00
```

	l.	*s.*	*d.*	
	280	0	0	English
	18	4	0	Exchange.
	288	4	0	Irish.

506l. at 5½ per Ct.? Answ. 533l. 16s. 7$\frac{1}{5}$d.

709l. at 7¾ per Ct.? Answ. 763l. 18s. 11$\frac{2}{5}$d.

956l. at 9⅛ per Ct.? Answ. 1043l. 4s. 8$\frac{2}{5}$d.

1015l. at 7¾ per Ct.? Answ. 1093l. 13s. 3d.

250l. at 3⅞ per Ct.? Answ. 259l. 13s. 9d.

763l. at $6\frac{1}{4}$ per Ct.? ANSW. 810l. 13s. 9d.

—— IV. ——

309l. 15s. 4d. Engliſh, at $4\frac{1}{4}$ per Ct. advance, how much Iriſh is it? ANSW. 322l. 18s. $7\frac{31}{50}$d.

Example.

l.	*s.*	*d.*	*l.*	*s.*	*d.*	
309 :	15 :	4	309 :	15 :	4	Engliſh.
		$4\frac{1}{4}$	13 :	3 :	$3\frac{31}{50}$	Exchange.
1239 :	1 :	4	£.322 :	18 :	$7\frac{31}{50}$	Iriſh.
77 :	8 :	10				
£.13|16 :	10 :	2				
20						
s. 3|30						
12						
d. 3|62	31					
equal						
100	50					

£. 103 : 0 : 11, at $5\frac{1}{3}$ per Ct.? ANSW. 108l. 10s. $9\frac{296}{300}$d.

£. 905 : 17 : 7, at $5\frac{1}{4}$ per Ct.? ANSW. 953l. 8s. $9\frac{31}{400}$d.

£. 300 : 15 : 0, at $7\frac{1}{2}$ per Ct.? ANSW. 323l. 6s. $1\frac{1}{2}$d.

£. 3014 : 16 : 0, at $3\frac{1}{8}$ per Ct.? ANSW. 3109l. 0s. 3d.

£. 460 : 19 : 9, at $5\frac{3}{4}$ per Ct.? ANSW. 487l. 9s. $10\frac{21}{80}$d.

£. 315 : 11 : 0, at 5⅜ per Ct.? Answ. 332l. 10s. $2\frac{119}{200}$d.

£. 999 : 19 : 0, at 3⅞ per Ct.? Answ. 1038l. 13s. $11\frac{}{200}$d.

£. 680 : 15 : 5, at 7⅝ per Ct.? Answ. 733l. 13s. $7\frac{}{800}$d.

—— V. ——

£. 100 : 10 : 6½, English Money, at 6½ per Ct. advance, how much Irish Money is it? Answ. 107l. 1s. $2\frac{289}{400}$d.

Example.

l.	*s.*	*d.*		*l.*	*s.*	*d.*
100	10	6½		100	10	6½
		6½		6	10	$8\frac{89}{400}$d.
603	3	3	Answ.	107	01	$2\frac{289}{400}$
50	5	3¼				
£. 6|53	8	6¼				
20						
s. 10|68						
12						
d. 8|22¼						
4						

$$\frac{89}{4} \times \frac{100}{1}$$

$$\frac{89}{400}$$

£. 150 : 18 : 6¾, at 5½ per Ct.? Answ. 159l. 4s. $7\frac{1}{800}$d.

£. 380

£. 380 : 15 : $9\frac{1}{2}$, at $5\frac{3}{4}$ per Ct.? Answ. 402l. 13s. $8\frac{517}{800}$d.

£. 400 : 0 : $6\frac{1}{4}$ at $7\frac{1}{8}$ per Ct.? Answ. 428l. 10s. $6\frac{85}{128}$d.

£. 519 : 19 : $11\frac{3}{4}$, at $6\frac{3}{4}$ per Ct.? Answ. 555l. 1s. $11\frac{1173}{1600}$d.

£. 100 : 10 : $6\frac{1}{4}$, at $5\frac{1}{8}$ per Ct.? Answ. 105l. 13s. $6\frac{461}{640}$d.

— VI. —

To reduce Irish Money into English.

A Merchant in London has a Bill of Exchange for 100l. Irish Money, which he sells or negotiates at 5 per Cent: that is, 105l. in Ireland, is worth 100l. in England. I demand how much English Money he is to receive? Answ. 95l. 4s. $9\frac{1}{7}$d.

Example.

$$\begin{array}{ccccc}
\textit{Irish.} & & \textit{English.} & & \textit{Irish.} \\
105 & \text{———} & 100 & \text{———} & 100 \\
 & & 20 & & \\ \hline
 & & 2000 & & \\
 & & 12 & & \\ \hline
 & & 24000 & & \\
 & & 100 & & \\ \hline
 & & 2400000 & &
\end{array}$$

$$\begin{array}{r}
\cancel{9}\cancel{6}\cancel{7}(5 \\
\cancel{3}\cancel{0}\cancel{0}\cancel{0}(1 \\
\cancel{2}\cancel{4}\cancel{0}\cancel{0}\cancel{0}\cancel{0}\cancel{0} \\
\cancel{1}\cancel{0}\cancel{5}\cancel{5}\cancel{5}\cancel{5}\cancel{5} \\
\cancel{1}\cancel{0}\cancel{0}\cancel{0}\cancel{0} \\
\cancel{1}\cancel{1}\cancel{1}
\end{array}
\left\{
\begin{array}{r}
\cancel{1}\cancel{0}\ (9 \\
\cancel{2}\cancel{2}\cancel{8}\cancel{5}\cancel{7} \\
\cancel{1}\cancel{2}\cancel{2}\cancel{2}\cancel{2} \\
\cancel{1}\cancel{1}\cancel{1}
\end{array}
\right\}
\begin{array}{l}
190 \mid 4 \\ \hline
95 : 4 : 9\frac{15}{105} \Big| \overset{15}{\frown}\frac{1}{7}
\end{array}$$

£. 160 : 10 : 0 Iriſh, at 7 per Ct. how much Engliſh? ANSW. 150l.

£. 545 : 14 : 0, at 7 per Ct. how much Engliſh? ANSW. 510l.

£. 1093 : 13 : 3, at $7\frac{3}{4}$ per Ct.? ANSW. 1015l.

£. 323 : 6 : $1\frac{1}{2}$, at $7\frac{1}{2}$ per Ct.? ANSW. 300l. 15s.

£. 62 : 2 : 0, at $3\frac{1}{2}$ per Ct.? ANSW. 60l.

£. 100 : 0 : 0, at $5\frac{1}{8}$ per Ct.? ANSW. 95l. 2s. $5\frac{811}{841}$d.

£. 314 : 5 : 0, at $4\frac{3}{4}$ per Ct.? ANSW. 300l.

£. 259 : 13 : 9, at $3\frac{7}{8}$ per Ct.? ANSW. 250l.

—— VII. ——

To reduce Sterling Money into Flemiſh.

A Merchant at Antwerp has a Bill of Exchange for 100l. payable in London, which he negotiates at 33s. 4d. Flemiſh, for 1l. Sterling, I demand how much Flemiſh Money he is to receive? ANSW. 166l. 13s. 4d. Flemiſh.

Example.

l. s. l.
1 —— $33\frac{1}{3}$ —— 100
$\cancel{3}$ ——
100
100
————
$\cancel{1}\cancel{1}\cancel{1}(\,1$
$1\cancel{0}\cancel{0}\cancel{0}\cancel{0}$ 333 | 3
————
$\cancel{3}\cancel{3}\cancel{3}\cancel{3}$ 166 : 13 : 4

Or thus.
£. 100
$33\frac{1}{3}$
————
3300
$33\frac{1}{3}$
————
333 : $3\frac{1}{3}$
————
166 : 13 : 4

How many l. Flemiſh, are 279l. 8s. Sterling, at 33s. 4d. Flemiſh, per l. Sterling? Answ. 465l. 13s. 4d.

In 150l. 10s. Sterling, at 33s. 6d. Flemiſh, per l. Sterling, how many l. Flemiſh? Answ. 252l. 1s. 9d.

How many l. Flemiſh, are in 169l. 10s. 11d. Sterling, at 33s. 3d. Flemiſh, per l. Sterling? Answ. 281l. 17s. 4$\frac{63}{80}$d.

—— VIII. ——

To reduce Flemiſh Money into Sterling.

If 1l. Sterling is 33s. 4d. Flemiſh, how many l. Sterling are there in 166l. 13s. 4d. Flemiſh? Answ. 100l.

Example.

$$
\begin{array}{cccccc}
s. & d. & \text{Sterl.} & l. & s. & d. \\
33 : & 4 & \text{———}1\text{———} & 166 : & 13 : & 4 \\
12 & & & 20 & & \\
\hline
400 & & & 3333 & & \\
 & & & 12 & & \\
\hline
 & & & \text{d. } \left.\begin{array}{r} \cancel{4}\cancel{0}\cancel{0}\cancel{0}\cancel{0} \\ \cancel{4}\cancel{4}\cancel{4}\cancel{0}\cancel{0} \end{array}\right\} & 100l. &
\end{array}
$$

How many l. Sterling are equal to 465l. 13s. 4d. Flemiſh, at 33s. 4d. Flemiſh, per l. Sterling? Answ. 279l. 8s.

In 252l. 1s. 9d. Flemiſh, at 33s. 6d. how many l. Sterling? Answ. 150l. 10s.

How many l. Sterling are in 199l. 19s. 11d. Flemiſh, at 33$\frac{3}{8}$s. per l. Sterling? Answ. 119l. 16s. 11$\frac{357}{801}$d.

—— IX.

—— IX. ——

To reduce Gilders into Sterling Money.

How many l. Sterling are in 1000 Gilders, 10 Stivers, the Exchange at 33s. 4d. Flemiſh, for 1l. Sterling? ANSW. 100l. 1s.

Example.

s. *d.* *l.* *Gil.* *Stiv.*
33 : 4——1——1000 : 10
12 20
———— ————
400 Groot 20010
2
————
$\cancel{4}\cancel{2}\cancel{0}$(20 } 100 and 20 over.
$\cancel{4}\cancel{4}\cancel{4}\cancel{0}\cancel{0}$ } 20
————
$\cancel{4}\cancel{0}\cancel{0}$ } 1s.
$\cancel{4}\cancel{0}\cancel{0}$ }

NOTE: *Each Gilder has* 20 *Stivers, and each Stiver* 2 *Groot or* 16 *Pennings, and each Shilling Flemiſh* 12 *Groot.*

How many l. Sterling are equal to 1680 Gilders, at 33s. 3d. Flemiſh per l. Sterling? ANSW. 168l. 8s. $5\frac{21}{399}$d.

In 2080 Gilders, 15 Stivers, at 34s. 9d. Flemiſh per l. Sterling, how many l. Sterling? ANSW. 199l. 11s. $10\frac{66}{417}$d.

At 33s. 11d. Flemiſh, per l. Sterling, I demand how many l. Sterling are in 6048 Gilders? ANSW. 504l. 7s. $11\frac{215}{407}$d.

2048 Gilders, 15 Stivers, at 34s. 5d. Flemiſh per l. Sterling, how many l. Sterling? ANSW. 198l. 8s. $6\frac{114}{413}$d.

How many l. Sterling are in 10909 Gilders, 19 Stivers, at 34s. 7d. Flemiſh per l. Sterling? Answ. 1051l. 11s. $2\frac{110}{413}$d.

In 1000 Gilders at $33\frac{1}{3}$s. Flemiſh per l. Sterling, how many l. Sterling? Answ. 100l.

—X.—

To reduce Pounds Sterling into Gilders.

How many Gilders are equal to 100l. Sterling, at 33s. 4d. Flemiſh, per l. Sterling? Answ. 1000 Gilders.

NOTE. *Each Gilder has* 40 *Groot.*

$$\begin{array}{ccccc} l. & & s. \;\; d. & & l. \\ 1 & \text{———} & 33 : 4 & \text{———} & 100 \\ & & 12 & & \\ & & \overline{400} & & \\ & & 100 & & \\ & & \overline{} & & \end{array}$$

$$\left.\begin{array}{r}\cancel{4}\cancel{0}\cancel{0}\cancel{0}\cancel{0}\\ \cancel{4}\cancel{4}\cancel{4}\cancel{4}\cancel{0}\end{array}\right\} 1000$$

How many Gilders are in 1409l. Sterling, if one l. Sterling is 33s. 8d. Flemiſh? Answ. 14230 Gilders, 18 Stivers.

In 100l. 11s. Sterling, at 33s. 9d. Flemiſh, per l. Sterling, how many Gilders? Answ. 1017 Gilders, $11\frac{1}{4}$ Stivers.

Tell me how many Gilders are in 1941l. 15s. 6d. Sterling, the Exchange at 33s. 11d. Flemiſh, per l. Sterling? Answ. 19757 Gilders, 11 Stivers, $3\frac{26}{145}$ Pennings.

At 34s. 5d. Flemiſh, per l. Sterling, I would know how many Gilders are there in 1597l. 9s. 11d. Sterling? Answ. 16494 Gilders, 2 Stivers, $14\frac{56}{140}$ Pennings.

—XI.

— XI. —

To reduce French Crowns into Pounds Sterling.

A Merchant is remitted a Bill of Exchange, from Paris, upon London, or any other Town in England or Ireland, for 1800 Crowns, at 32½d. Sterling per Crown, how many l. Sterling does it come to? Answ. 243l. 15s.

Example.

$$\begin{array}{r} 1800 \\ 32\frac{1}{2} \\ \hline 3600 \\ 5400 \\ 900 \\ \hline \end{array}$$

$$\begin{array}{r} \cancel{1}\cancel{0}\cancel{0}\cancel{6} \\ \cancel{5}\cancel{8}\cancel{5}\cancel{0}\cancel{0} \\ \cancel{1}\cancel{2} \end{array} \left\{ \begin{array}{l} 487 \mid 5 \\ \hline 243 : 15s. \end{array} \right.$$

How many l. Sterling are equal to 1000 French Crowns, at 33¼d. Sterling, per Crown? Answ. 138l. 10s. 10d.

In 1263½ Crowns, at 32½d. Sterling, per Crown, how many l. Sterling? Answ. 171l. 1s. 11¾d.

How many l. Sterling are equal to 1037¾ Crowns, at 33d. Sterling, for every Crown? Answ. 142l. 13s. 9¾d.

In 1976 Crowns, 1 Livre, 4 Sols, at 32½d. Sterling, per Crown, how many l. Sterling? Answ. 276l. 12s. 9d.

At 33¾d. Sterling, per Crown, how many l. Sterling, are in 1000 Crowns? Answ. 140l. 12s. 6d.

How many l. Sterling, are in 2822 Crowns, 2 Livres, 8 Sols, 4 Deniers, at 36d. Sterling, per Crown? Answ. 423l. 8s. 5d.

— XII. —

To reduce Pounds Sterling into French Crowns.

A Bill being drawn in London, or any other Town of England or Ireland, upon Paris, or any other Part of France, for 243l. 15s. at 32½d. Sterling per Crown; how many Crowns or Livres are to be paid for that Bill? Answ. 1800 Crowns, or 5400 Livres.

NOTE. *A Crown is* 3 *Livres Tournois, a Livre is* 20 *Sols, and a Sol* 12 *Deniers.*

Example.

```
 d.       Crown.       l.   s.
 32½———————1——————————243 : 15
 ———                    20
 65                   ——————
                       4875
                         12
                      ——————
                      58500
                          2
                      ——————
                     52
                     117000 { 1800 Crowns.
                       65   {    3
                              ——————
                              5400 Livres.
```

How many Crowns are equal to 138l. 10s. 10d. Sterling, at 33¾d. per Crown? Answ. 1000 Crowns, or 3000 Livres.

In 171l. 1s. 11¾d. Sterling, how many Crowns, at 32½d. Sterling, per Crown? Answ. 1263½ Crowns, or 3790 Livres, 10 Sols.

How many Crowns are in 142l. 13s. 9¾d. Sterling, at 33d. Sterling, per Crown? Answ. 1037¾ Crowns, or 3113 Livres, 5 Sols.

How many Crowns are there in 267l. 12s. 9d. Sterling, at 32½d. Sterling, per Crown? Answ. 1976 Crowns, 1 Livre, 4 Sols.

In 140l. 12s. 6d. Sterling, how many Crowns at 33¾d. Sterling, per Crown? Answ. 1000 Crowns.

How many Crowns, Tournois, are equal to 423l. 8s. 5d. Sterling, Exchange at 36d. Sterling, per Crown? Answ. 2822 Crowns, 2 Livres, 8 Sols, 4 Deniers.

— XIII. —

To reduce Hamburgh Money into Pounds Sterling.

A Bill being drawn at Hamburgh, upon London, or any other Town in England or Ireland, for 3083 Mark, 12⅔ Stivers Lubs, at 32s. 4d. Groſs for the l. Sterling, how much Engliſh Money will it come to? Answ. 254l. 6s. 8d.

Example.

Example.

l. *d.* *l.* Mark, Stiv.
32 : 4 —— 1 —— 3083 : $12\frac{2}{3}$
12 Groſs in a Mark 32 2

388 Groſs. 6166 $25\frac{1}{3}$ Groſs.
9249

98656
add $25\frac{1}{3}$

$98681\frac{1}{3}$ Groſs.

$$\begin{array}{r} (1\\ (2\\ (9\\ \cancel{9}\cancel{8}\cancel{6}\cancel{8}\cancel{1}\tfrac{1}{3}\\ \cancel{3}\cancel{8}\cancel{8}\cancel{8}\cancel{8}\\ \cancel{3}\cancel{8}\cancel{8}\\ \cancel{3} \end{array} \left\{ 254\text{l. } 6\text{s. } 8\text{d.} \right.$$

NOTE. *The remaining* $129\frac{1}{3}$ *multiply by* 20, *and the Product divide again by* 388, *and there will come* 6*s.* *then there will remain* $258\frac{2}{3}$, *which multiply by* 12, *and divide the Product again by* 388, *and there will come* 8*d.*

In 2443 Mark, $9\frac{1}{2}$ Stivers Lubs, how many l. Sterling, at 32s. 6d. Groſs, per l. Sterling? ANSW. 200l. 10s.

In 6763 Mark, $14\frac{3}{8}$ Stivers Lubs, at 32s. 9d. Groſs, per l. Sterling, how many l. Sterling? ANSW. 550l. 15s.

In 12093 Mark, 12 Stivers Lubs, at 32s. 3d. Groſs, per l. Sterling, how many l. Sterling? ANSW. 1000l.

How many l. Sterling, are in 4211 Mark, $1\frac{3}{8}$ Stivers Lubs, at 32s. 6d. Groſs, per l. Sterling? ANSW. 345l. 10s. 6d.

—— XIV. ——

To reduce Pounds Sterling into Hamburgh Money.

A Bill of 254⅓ l. Sterling, being drawn at London, or any other Town in England or Ireland, upon Hamburgh, at 32⅓ Shill. Groſs, per l. Sterling, how many Mark Lubs are to be paid for that Bill? Answ. 3083 Marks 12⅔ Stivers Lubs.

Example.

l. —— s. d. —— l.
1 —— 32 : 4 —— 254⅓
12 —— 388

388 —— 2032
2032
762
129⅓

9868 1⅓ Groſs.

(2
222(5
98681⅓ } 3082 Mk. 12⅔ Stiv. Lubs.
32

NOTE. *The remaining* 25⅓ *Groſs, divide by* 2, *and they will be* 12⅔ *Stivers.*

How many Mark Lubs are equal to 200l. 10s. at 32½ Shillings, groſs, per l. Sterling? Answ. 2443 Mk. 9½ Stiv. Lubs.

How many Mark Lubs are in 550l. 15s. Sterl. at 32s. 9d. Groſs, per l. Sterl.? Answ. 6763 Mk. 14⅜ Stiv. Lubs.

In 1000l. Sterling, at 32s. 3d. Groſs per l. Sterl. how many Mark Lubs? Answ. 12093 Mk. 12 Stiv. Lubs.

In 345l. 10s. 6d. Sterl. at 32s. 6d. Groſs, per l. Sterl. how many Mark Lubs? Answ. 4211 Mk. 1⅜ Stiv. Lubs.

—— XV.

— XV. —

To reduce Portugal Money into Pounds Sterling.

A Merchant has a Bill of Exchange for 850 $, 500 Res, payable in Liſbon, which Bill he negociates or ſells at 5s. 4d. per Milre. I demand how many l. Sterling he is to receive? ANSW. 226l. 16s.

Example.

	85 500
	5s. 4d.
d.	4250
4 is $\frac{1}{3}$s.	283 : 4
500 is $\frac{1}{2}$	2 : 8
	453|6 : 0
£. 226 : 16 : 0	

How many l. Sterling, in 1000 $ 000 Res, at 5s. 6d. per Milre? ANSW. 275l.

2000 $ 000 Res, at 5s. 8½d. per Milre, how many l. ANSW. 570l. 16s. 8d.

At 5s. 6¾d. per Milre how many l. will 2060 $ 380 Res make? ANSW. 573l. 0s. 10$\frac{292}{800}$d.

Tell me how many l. are in 1056 $, 999 Res, at 5s. 4¼d. per Milre? ANSW. 282l. 19s. 4$\frac{743}{4000}$d.

— XVI. —

To reduce Sterling Money into Portugal Money.

How many Milres are equal to 226l. 16s. the Exchange at 5s. 4d. per Milre? ANSW. 850 $, 500 Res.

Example.

```
 s.  d.           Res              l.    s.
 5 : 4 —————————— 1000 —————————— 226 : 16
12                                 20
——                          ————————————
64                               4536
                                   12
                            ————————————
                                54432
                                 1000
                            ————————————
                              323
                        544320000 ⎧          Res
                          6444444 ⎨ 850.$ 500
                            66666 ⎩
```

In 275l. at 5s. 6d. per Milre, how many Milres? Answ. 1000 $ 000 Res.

How many Milres are in 570l. 16s. 8d. the Exchange at 5s. 8½d. per Milre? Answ. 2000 $, 000 Res.

At 5s. 10d. per Milre, how many Milres are in 106l. 5s. 6¼d.? Answ. 364 $, 375 Res.

—— XVII. ——

1. When the PAR of Exchange between England and Holland is at 33s. 4d. Flemiſh, per Pound Sterling, how much is a Gilder of 20 Stivers, then worth in London? Answ. 2s.

Example.

s. Flem. — *s.* Ster. — Stiv.

If $33\frac{1}{3}$ ———— 20 ———— 20

3 ———— 100 ———— 6 ———— 60 ———— 20

600 Stivers.

$\cancel{1}\cancel{2}\cancel{0}\cancel{0}$ / $\cancel{6}\cancel{0}\cancel{0}$ } 2 Shill.

Or thus,

s. *d.* — *s.* Ster. — Stiv.

33 : 4 ———— 20 ———— 20

12 — 2

400 Groot. — 40 Groot.

20

$\cancel{8}\cancel{0}\cancel{0}$ / $\cancel{4}\cancel{0}\cancel{0}$ } 2 Shill.

NOTE, *PAR, in Trade or Commerce, is a Kind of Equality among Monies, or how much a Perſon muſt give of one Kind of Species, to render it juſt equivalent to a certain Quantity of another.*

The PAR differs from the Courſe of Exchange in this, that the PAR of Exchange ſhews what one Nation ſhould allow another in Exchange, which is certain and fixt; but the Courſe of Exchange ſhews what they will allow in Exchange, which is uncertain, ſometimes more, and ſometimes leſs.

2. What is the PAR of Exchange between England and Holland, that is, how many Shillings Flemiſh, are equal to 20 Shillings Sterling, when a Gilder or 20 Stivers, is equal to 2 Shillings ſterling? Answ. $33\frac{1}{3}$ Shill. Flemiſh.

3. When the PAR of Exchange between France and England was at 54 Pence Sterling per Crown, of 3 Livres Tournois, what ought the PAR to be when that Crown is raiſed, in France, to 5 Livres? ANSW. 32⅖d.

4. What is the PAR of Exchange between England, and Ireland, if a Guinea paſſes in England for 21 Shillings, and a Crown for 5 Shillings, and in Ireland the ſame Guinea goes for 22s. 9d. and the Crown for 5 Shillings and 5 Pence? ANSW. 8⅓ per Cent.

5. If for 150l. Engliſh Money, there is paid 160l. 10s. Iriſh, what is the Exchange? ANSW. 7 per Cent.

6. Which is it better for a Merchant in Ireland, to have Crowns ſent him from England; or to draw at 7 per Cent. advance, when a Crown is 5s. in England, and 5s. 5d. in Ireland? ANSW. 'Tis better to have Crowns ſent him by 1⅓ per Cent.

7. When the Exchange from London to Liſbon is at 5½s. per Milre, and the Exchange between London and Cork is at 8¾ per Cent. advance for Cork, how much is then a Milre worth at Cork? ANSW. 5s. 11$\frac{31}{40}$d.

8. If for 1037¾ French Crowns there is paid in London 142l. 13s. 9¾d. what is the Exchange? ANSW. 33d. per Crown.

9. What is the Exchange if for 314l. 5s. Iriſh Money, there is paid in England 300l.? ANSW. 4¾ per Cent.

10. When the Exchange between London and Rotterdam is $35\frac{3}{4}$ Shillings, Flemiſh, per Pound ſterling, how much is an Engliſh Crown of 5s. then worth at Rotterdam? Answ. $53\frac{5}{8}$ Stivers.

11. If for 150l. 10s. ſterling there is paid 252l. 1s. 9d. Flemiſh, what is the Exchange? Answ. $33\frac{1}{2}$s. Flemiſh, per l. ſterling.

12. At how much is the Exchange, when for 60l. Engliſh Money, there is paid 62l. 2s. Iriſh? Answ. $3\frac{1}{2}$ per Cent.

13. If a French Crown is worth at Rotterdam 2 Gilders, 8 Stivers, how much is that Crown worth at London, when the Exchange is at 35s. Flemiſh, per l. ſterling? Answ. $4\frac{4}{7}$s.

14. If for 850 \$, 500 Res, there is paid in London 226l. 16s. how much is then the Exchange? Answ. 5s. 4d. per Milre.

15. How much is the Exchange between Amſterdam and London, if a French Crown is worth at London, $4\frac{4}{7}$s. ſterling, and at Amſterdam 48 Stivers? Answ. 35s. Flemiſh per l. ſterl.

16. When an Engliſh Shilling is worth 11 Stivers at Rotterdam, how much is then the Exchange? Answ. $36\frac{2}{3}$s. Flemiſh, per l. ſterl.

17. When a Guinea at London is 21 Shillings, and at Rotterdam 11 Gilders, 11 Stivers, whether is it better to ſend Guineas to Rotterdam, or remit Bills of Exchange, at $36\frac{2}{3}$s. Flemiſh, per l. ſterl.? Answ. 'Tis equal.

18. What is the Exchange between London and Hamburgh, when for 2443 Mark, $9\frac{1}{2}$ Stivers Lubs, there is paid in London 200l. 10s.? Answ. 32s. 6d. Groſs Lubs per l. ſterl.

— XVIII. —

19. What is a Gilder worth at Cork, if the Exchange between London and Rotterdam is at 35s. Flemiſh per l. ſterling, and the Exchange from Cork to London at 9 per Cent. advance? Answ. 2$\frac{8}{103}$s.

Note, *A Shilling Flemiſh is 6 Stivers.*

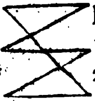
Example.

s. Flem. s. Stiv.
If 35————20————20 comes 1$\frac{19}{21}$s.
l. Lond. l. Cork, s. Lond.
100————109————1$\frac{19}{21}$ Answ. 2$\frac{8}{103}$s.

Or thus.

Imagine two Columns, and in the firſt put any one of the given Numbers, and againſt it, in the ſecond Column, put its relative, then put in the firſt Column that which is of the ſame name with the laſt of the ſecond Column, and in the ſecond Column put its relative, and ſo on, until the laſt in the ſecond Column is of the ſame name with the firſt in the firſt Column: For the number ſought put an (*) then multiply all the Numbers which ſtand under one another, continually together, and divide the Product of the Column which hath no (*) by the Product of the other Column, and the Quotient is the Anſwer required.

Example.



Stiv.
35s. Flem. or 210 — 1. London.
London. l. 100 — 109l. Cork,
How much at Cork* — 20 Stiv. Rotterdam.

21000
Answ. $\frac{2180}{21000}$ l. equal to 2$\frac{8}{103}$s.

Or thus,

London, l. 1	210 Stiv. Rotterdam,
Stiv. Rotterdam, 20	* how many l. Cork ?
Cork, l. 109	100l. London.

2180 21000
Answ.——l. equal to $2\frac{8}{105}$s.

How many s. Cork*	20 Stiv. Rotterdam,
Stiv. at Rotterd. 210	1 l. London,
London, l. 100	109l. Cork.

Answ. $2\frac{8}{105}$s.

Or thus,

London, l. 100	109l. Cork,
How many s. Cork*	20 Stiv. Rotterdam,
Stiv. at Rotterd. 210	1 l. London,

Answ. $2\frac{8}{105}$s.

Or thus,

Cork, l. 109	100l. London,
London, l. 1	210 Stiv. Rotterdam,
Stiv. at Rotterd. 20	*how many s. Cork.

Answ. $2\frac{8}{105}$s.

20. When the Exchange between London and Cork, is at 6 per Cent, advance for Cork, and the Exchange between London and Hamburgh at 33s. 4d. Groſs, per l. Sterling, what is a Mark Lub then worth at Cork? Answ. $20\frac{44}{125}$d.

21. How much would a French Livre of 20 Sols be worth at Cork when the Exchange between

London and Paris, or any other Part of France, is at 34d. ſterling, per Crown of 3 Livres, and the Exchange between London and Cork at 5 per Cent. advance for Cork? Answ. $11\frac{9}{10}$d.

22. When 105l. at Cork, is worth 100l. at London, and the Exchange between London and Paris at 36d. per Crown of 3 Livres, or 60 Sols, how much is then 12d. of Cork worth at Paris? Answ. $19\frac{1}{21}$ Sols.

23. What is a Gilder of 20 Stivers worth at Cork, when the Exchange, between London and Rotterdam, is at 33s. 4d. Flemiſh per l. Sterling, and the Exchange, between London and Cork, at $8\frac{1}{3}$ per Cent. advance for Cork? Answ. 26d.

24. When the Exchange between London and Cork is at $8\frac{3}{4}$ per Cent. advance for Cork, and the Exchange, between London and Rotterdam is at 33s. 4d. Flemiſh, per l. ſterling, how much is 12 Pence of Cork then worth at Rotterdam? Answ. $9\frac{17}{87}$ Stivers.

25. At how much ought the Exchange to be between London and Cork, to make the Money at a PAR, when a Crown in London is 5 Shillings, and the ſame Crown in Cork 5s. 5d.? Answ. $8\frac{1}{3}$ per Ct.

26. A Merchant in Liſbon owes to a Merchant in Cork 1000\$000 Res. I would know which is more advantageous to the Merchant in Cork, whether the Merchant in Liſbon ſends him Moidores of 4000 Res a Piece, which paſs in Cork for 29s. 3d. a Piece, or to have the Debt remitted to London at 6s. 6d. per Milre: and from London

remitted to Cork, at 8 per Cent. advance for Cork? ANSW. 'Tis more advantageous to have Moidores ſent him by 4$\frac{1}{6}$ per Cent.

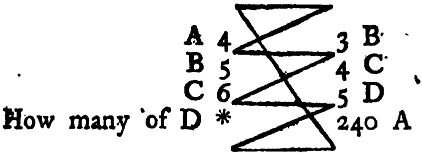
27. A Merchant at Cork ſends to Bourdeaux in France 100 Barrels of Beef, which ſtand him, clear of all Charges at Bourdeaux 22s. per Barrel, I would know for how many Livres they muſt be ſold a Barrel at Bourdeaux to gain 20 per Cent. if the Money can be remitted to London at 36d. ſterling per Crown, and from London to Cork, at 8 per Cent. advance for Cork? ANSW. For 24 Livres, 8 Sols, 10$\frac{2}{5}$ Deniers.

NOTE, *This queſtion can be ſolved by 3 Figures beſides the ſtating.*

—— XIX. ——

28. If 4lb. of A, are as heavy as 3lb. of B, and 5lb. of B. as 4lb. of C, and 6lb. of C, as 5lb. of D how many lb. of D are then as heavy as 240lb. of A? ANSW. 120lb. of D.

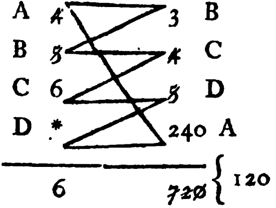
Examples.



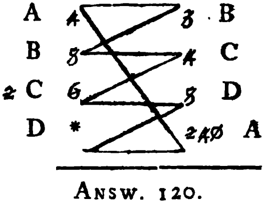
~~120~~ ~~14400~~ | 120lb. of D.

NOTE, *All the Numbers that are the ſame in the firſt Column with thoſe in the ſecond, may be cancelled in both, which will oftentimes ſave much Labour.*

As thus,



Or thus,



29. If 112lb. of Pewter at London coſt 3l. 15s. how many Stivers will 1lb. coſt at Rotterdam, if 100l. at Rotterdam are equal to 110l. at London, and the Exchange at 35 Shillings Flemiſh per l. Sterling? Answ. 7$\frac{1645}{2240}$ Stivers.

30. If 3 Yards of Cloth coſt as much as 3¾ of Ratteen, and 4½ Yards of Ratteen are worth 5 Yards of Drugget, how many Yards of Drugget are then worth 27 Yards of Cloth? Answ. 37½ Yards.

31. If 3 Yards in London, are equal to 4 Ells in Holland, and 50 Ells in Holland coſt 26l. Flemiſh, how many l. Flemiſh, will 40 Yards, in London, come to? Answ, 27$\frac{11}{15}$l, Flemiſh.

32. What will 1lb. of Pepper coſt, if 3lb. of Cloves coſt as much as 6lb. of Pepper, and 2½lb. of Cinnamon coſt as much as 4lb. of Cloves, and 3lb. of Cinnamon coſt 8 Shillings? Answ. 10d.

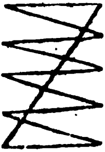
—— XX. ——

33. If 102lb. at Rotterdam is 112lb. in Cork, and a Ton of Tallow coſt at Cork, 27l. and the Exchange from Cork to London, is 8 per Cent.

advance, and the Exchange from London to Rotterdam at 34s. Flemiſh, for 1l. ſterling, I demand how many Gilders 100lb. of the ſaid Tallow will ſtand me in at Rotterdam, without Freight or any other Charges? ANSW. 12 Gilders, 10 Stivers.

Example.

lb. Rotterdam,	102		112lb. Cork,
lb. Tallow,	2240		27l. Cork,
l. Cork,	108		100l. London,
l. London,	1		34s. Flemiſh,
What will	*		100lb. Rotterdam.



$$\cancel{24675840}\left\{\begin{matrix}(16450560\\ \cancel{1028160000}\\ \end{matrix}\right\{\begin{matrix}41 \text{ Shill.}\\ 6\end{matrix}$$

$$\text{over } \begin{matrix}16450560\\ 6\end{matrix} \qquad \begin{matrix}24|6 \text{ Stiv.}\end{matrix}$$

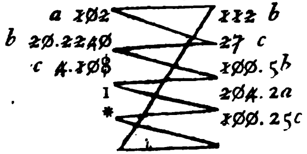
$$\begin{matrix} & 12:6\\ \text{add} & 4\\ \end{matrix}$$

$$\cancel{24675840}\left\{\cancel{98703360}\right\}4$$

$$\text{Gil. } 12:10$$

To ſhew with how few Figures the Anſwer of this Queſtion may be attained to, I ſhall, for the Curious, give an Example, to ſhew what Labour often may be ſpared, when one rightly underſtands how to contract or leſſen the Numbers of the firſt Column againſt the ſecond, or thoſe of the ſecond againſt the firſt, keeping ſtill the ſame Proportion.

Thus,



25|0 Stiv.

ANSW. Gil. 12 : 10

Here you ſee that the Figures made uſe of, beſides the ſtating of the Queſtion are only 14, *the Anſwer included, in which there are* 7, *ſo that in Reality, only* 7 *Figures are employed, whereas if the figures in the firſt Column had been multiplied in themſelves, and alſo thoſe of the ſecond, and then thoſe Products divided into one another, as the Nature of the Queſtion required, no leſs than* 155 *Figures, excluding the Anſwer, would have done.*

34. A Merchant in Cork, has bought for his Correſpondent in Liſbon, 1 Ton of Butter, which coſt, with all Charges on Board, 25l. now if 100lb. of Cork are equal to 105lb. at Liſbon, and the Exchange from London to Liſbon is at 6s. 3d. per Milre, and the Exchange from London to Cork at 5 per Cent. advance for Cork; I would know how many Res the ſaid butter will ſtand in at Liſbon, without Freight or other Charges there? ANSW. 76 ℔, 190$\frac{10}{11}$ Res.

This Queſtion is ſolved by 8 *Figures, excluſive of the Anſwer and Stating.*

CHAP.

CHAP. XXI.

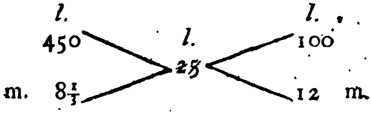
The Double Rule of THREE DIRECT.

SECT. I.

THIS *Rule has its Name from having five Numbers given, to find a ſixth in Proportion thereunto, of which five numbers, there are three of Suppoſition, and two of Demand, and is reſolved thus,*

1. If 450l. in 8⅓ Months gain 25l. at how much per Ct. is that per Annum? ANSW. 8 per Ct.

Example.



25

1200
3
3600
450 } 8 ANSW.
4

Or thus,

m. l. m.
If 8⅓ ——— 25 ——— 12 comes 36.
If 450 ——— 36 ——— 100 ANSW. 8.

2. If 240l. in 16 Months, gain 64l. how much will 60l. gain in 6 Months? ANSW. 6l.

3. If 60l. gain in 6 Months 6l. what will 240l. gain in 16 Months? ANSW. 64l.

4. A Merchant agrees with a Carrier, to carry 15 Ct. of Goods, 40 Miles, for 10 Crowns, (each Crown 65d.) how much muſt one pay in proportion to have 6Ct. carried 32 Miles? Answ. 17s. 4d.

5. If 20Ct. are to be carried 50 Miles for 5l. how much will 40Ct. coſt if they were to be carried 100 Miles? Answ. 20l.

6. How much will 32$\frac{2}{5}$l. gain in 4 Months and 15 Days (each Month 30 Days) if 324l. gain in 14 Months 35l.? Answ. 1l. 2s. 6d.

7. If 32$\frac{2}{5}$l. get 1$\frac{1}{8}$ in 4$\frac{1}{2}$ Months, how much will 324l. get in 14 Months? Answ. 35l.

8. If 1lb. of Thread makes 3 Yds. of Linen of 1$\frac{3}{4}$ Yard broad, how many lb. of Thread would be wanted to make a Piece of Linen of 45 Yards long, and 1 Yard broad? Answ. 12lb.

9. If 3lb. of Worſted make 10 Yards of Stuff of 1$\frac{1}{2}$ Yard broad, how many lb. would be wanted to make a Piece of 100 Yards long, and 1$\frac{1}{4}$ broad? Answ. 25l.

10. If $\frac{1}{2}$ a Yard of Cloth, of 1$\frac{3}{4}$ Yard broad, is made with $\frac{1}{4}$lb. of Yarn, how many lb. will be wanted to make a Piece of Cloth 80 Yards long, and $\frac{3}{4}$ Yard broad, Answ. 17$\frac{1}{7}$lb.

11. If 15$\frac{1}{8}$lb. of Worſted make 15$\frac{3}{4}$ Yards of Cloth of 1$\frac{1}{2}$ Yard broad, how many lb. of Worſted will be wanted to make a Piece of Cloth of 75$\frac{1}{2}$ Yards long, and 1$\frac{1}{4}$ Yard broad? Answ. 60$\frac{635}{1512}$lb.

12. If 12 Men in 8 Days gain 8l. 8s. what will 28 Men gain in 15 Days? Answ. 36l. 15s.

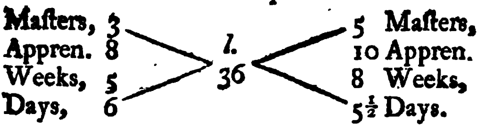
13. What will 12 Men gain in 8 Days, if 28 Men in 15 Days gain 36l. 15s.? Answ. 8$\frac{2}{5}$l.

14. If I had a Bond for 876l. 14s. 10d. payable in 79 Days, and agreed to receive the Money immediately, with 6 per Ct. per Annum Abatement, I demand how much I am to receive? Answ. 865l. 7s. 1$\frac{4092}{9121}$d.

II.

15. If three Masters, who have each 8 Apprentices, in 5 Week, each Week 6 Days, earn 36l. how much will 5 Masters, who have each 10 Apprentices, earn in 8 Weeks, each Week 5½ Days, their daily Wages being equal to the former? Answ. 110l.

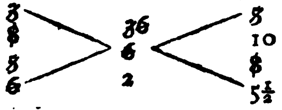
Example.



720 4400
2 36

$\cancel{1}\cancel{4}\cancel{4}\cancel{0}$ $\cancel{1}\cancel{5}\cancel{8}\cancel{4}\cancel{0}\cancel{0}$ Answ. 110l.

Or thus,



55
2

Answ. 110l.

16. If a Ciſtern of 16 Feet long, 7 Feet broad, and 15 Feet deep, coſt 9l. 6s. 8d. I demand how much, in Proportion, another Ciſtern would ſtand in, of 17½ Feet long, 10½ Feet broad, and 13 Feet deep? ANSW. 13l. 5s. 5d.

17. How many Stones, of ¾ Feet long, ⅔ Foot broad, and ⅘ Foot thick, would build a Wall of 160 Feet long, 30 Feet high, and 2 Feet thick? ANSW. 24000.

18. If a Ciſtern of 17½ Feet long, 10½ Feet broad, and 13 Feet deep, holds 546 Barrels of Water, how many Barrels will a Ciſtern hold of 16 Feet long, 7 Feet broad, and 15 Feet deep? ANSW. 384 Barrels.

19. If 6 Shoemakers, in 4 Weeks, make 36 Pair of Mens, and 24 Pair of Womens Shoes, how many Pair of each Sort would 18 Shoe-makers make in 5 Weeks? ANSW. 135 Pair of Mens, and 90 Pair of Womens Shoes.

CHAP. XXII.

OF INVERSE PROPORTION, or the RULE of THREE INVERSE.

SECT. I.

WHEREAS, *in the Rule of Three Direct, more required more, or leſs required leſs, ſo here the contrary, more requires leſs, and leſs requires more. That is, the greater the third Number is, the leſs the fourth will be, and the leſs the third Number is, the greater the fourth will be.*

RULE. Let your firſt and laſt Number be of one Name, then multiply your firſt and ſecond Number together, and the Product divide by the third Number, and the Quotient is the Anſwer required.

1. A Captain of a ſhip, being provided with Proviſions for 40 Men 10 Months, how long would thoſe Proviſions laſt for 32 Men? Answ. 12½ Months.

Example.

$$\begin{array}{lcr} \text{Men} & \text{Months} & \text{Men} \\ 40 \text{———} & 10 & \text{———} 32 \end{array}$$

$$\begin{array}{r} 10 \\ \hline \cancel{4}\cancel{0}\cancel{0} \\ \cancel{3}\cancel{2}\cancel{2} \\ \cancel{3} \end{array}\left\{ 12\tfrac{1}{2} \right.$$

2. If 12½ Months Proviſion ſerve 32 Men, how long would the ſame ſerve 40 Men? Answ. 10 Months.

3. A Merchant has agreed with a Carrier to carry 12Ct. of Merchandize 70 Miles, for 13 Crowns, but the Cars being laden, the Carrier is obliged to unlade 2Ct. of the ſaid Goods, however, the Merchant will ſtill give the 13 Crowns, provided he carries the goods ſo much farther in Proportion: I demand how many Miles they muſt be carried? Answ. 84 Miles.

4. If 10Ct. are to be carried 84 Miles for 13 Crowns, how many Miles are 12Ct. to be carried for the ſame Money? Answ. 70 Miles.

5. If I had bought 30 Yards of Cloth, of 2 Yards broad, and would have Baize of 3 Yards broad to line the ſame with; I demand how many Yards I ſhould want? Answ. 20 Yards.

6. If I lend my Friend 400l. for 7 Months, how much Money ought he to lend me again for 12 Months? Answ. 233l. 6s. 8d.

7. Suppoſe 4000 Soldiers, in a Town, were provided with Proviſions for 3 Months, how many Men muſt they ſend out in Caſe they would have the Proviſions laſt 8 Months? Answ. 2500 Men.

8. When the Buſhel of Wheat coſts 5s. 8d. the Penny Loaf weighs $11\frac{1}{2}$ oz. what muſt it weigh when the Buſhel coſts 10s. 9d.? Answ. $6\frac{8}{129}$ oz.

9. If 136 Maſons can make a Fort in 28 Days, and that it was required to have the ſame finiſhed in 8 Days, I demand how many Maſons would do it? Answ. 476 Maſons.

10. How many Yards of Linen, of $\frac{5}{6}$ Yard broad would be wanted to line $9\frac{2}{3}$ Yards of Cloth of $1\frac{1}{4}$ Yard broad? Answ. $14\frac{1}{2}$ Yards.

11. If a Horſeman rides 100 Miles in 33 Hours, 20 Minutes, that is, at the Rate of 3 Miles an Hour, in what Time would he ride the ſame diſtance, if he went at the Rate of $5\frac{1}{4}$ Miles an Hour? Answ. 19 Hours, $2\frac{6}{7}$ Minutes.

12. If with 100l. in 365 Days I gain 6l. with how many Pounds ſterling could I gain the ſame ſum in 30 Days? Answ. With 1216l. 13s. 4d.

13. If 6 Perſons in 4 Hours drink 3 Gallons of Beer, in what Time would 5 Perſons drink the ſame Quantity if they drink at the ſame Rate? Answ. In 4 Hours 48 Minutes.

14. What ſum ought to be put at Intereſt, at 6 per Ct. to gain in one Month as much as 100l. would gain in 12 Months? Answ. 1200l.

CHAP. XXIII.

The Double Rule of Three Compound.

SECT. I.

THIS *Rule, like the Double Rule of Three Direct, contains alſo two Rules of Three, but the one is Direct, and the other Inverſe.*

1. If 100l. in 12 Months gain 5l. with how many Pounds can I gain, in 16 Months, 30l.? Answ. 450l.

Example.

$$\begin{array}{lrcrl}
 & 16 & \text{Stock,} & 12 & \\
\text{M.} & 12 & > 100 < & 16 & \text{Inverſe.}\\
\text{Gain} & 5 & & 30 & \text{Direct.}\\
\cline{2-2}\cline{4-4}
 & 80 & & 360 & \\
 & & & 100 & \\
\cline{4-4}
\end{array}$$

$$\left.\begin{array}{r}4\\ \cancel{36000}\\ \cancel{8880}\end{array}\right\} 450\text{l.}$$

Or thus, by Direct Rules.

If 12———5———16 comes $6\frac{2}{3}$
Gain Stock Gain
If $6\frac{2}{3}$———100———30 Answ. 450l.

Or thus,

Inverſe 12———100———16 comes 75l.
Direct 5——— 75 ———30 Answ. 450l.

2. With how many Pounds Sterling, could I gain 5l. per Annum, if with 450l. I gain in 16 Months 30l.? Answ. With 100l.

3. If 8l. are gained in 12 Months with 100l. with how much Money can I gain 8l. 12s. in 5 Months? Answ. With 258l.

4. If 200l. of Merchandizes are carried 40 Miles, for 3s. how many lb. might be carried 60 Miles for 22l. 14s. 6d.? Answ. 20200lb.

5. If a Wall of 28 Feet high is built in 15 Days by 68 Men, how many Men could build a Wall of 32 Feet high in 8 Days? Answ. $145\frac{5}{7}$ Men.

6. If for 3s. 200 lb. of Merchandizes are carried 40 Miles, how many Miles might 20200 lb. be carried for 22l. 14s. 6d.? Answ. 60 Miles.

7. If 145 Men in 8 Days, can make a Wall of 32 Feet high, how many Men would make another Wall of 28 Feet high, in 15 Days? Answ. $67\frac{2}{3}$ Men.

8. If 80000 Ct. of Ammunition were to be removed from a Place in 9 Days, and that in 6 Days Time I find to have carried away 4500 Ct. with 18

Horſes, how many Horſes would be wanted to carry the Remainder away in 3 Days? Answ. 604 Horſes.

9. In what Time could I, with 600l. gain 33l. 6s. 8d. at 6¼ per Cent. per Annum? Answ. In 10 Months, 20 Days, or in 10⅔ Months.

10. If 33⅓ are gained with 600l. in 10⅔ Months, in what Time could I get 6¼ with 100l.? Answ. In 1 Year.

CHAP. XXIV.

Of INTEREST.

SECT. I.

1. HOW much is the Intereſt of 100l. for 4½ Years, at the Rate of 8 per Ct. Answ. 36l.

Example.

Year *l.* *Years*
1——8——4½
2
$\overline{}$
9
8
—
$\cancel{7}\cancel{2}$ } 36l.
$\cancel{2}\cancel{2}$

Or thus,
8
4½
——
4 Years 32
½ Year 4
——
Answ. 36l.

2. What is the Intereſt of 100l. for 5 Years and 3 Months, at the Rate of 8 per Cent.? Answ. 42l.

3. How much is the Intereſt of 100l. for 1 Year and 9 Months, at 6 per Cent.? Answ. 10l. 10s.

4. What is the Intereſt of 100l. for 7½ Months, at 7 per Cent.? Answ. 4l. 7s. 6d.

5. Caſt up the Intereſt of 100l. for 10 Years, and 4 Months, at 6 per Cent.? Answ. 62l.

6. Tell me the Intereſt of 100l. for 1½ Month, at 8 per Cent.? Answ. 1l.

—— II. ——

7. What is the Intereſt of 211l. 5s. for one Year, at 6 per Cent.? Answ. 12l. 13s. 6d.

Example.

l. *s.*
211 : 5
6
£. 12|67 : 10
20
s. 13|50
12
d. 6|00

8. How much is the Intereſt of 300l. 10s. for 1 Year, at the Rate of 8 per Cent.? Answ. 24l. 0s. 9⅗d.

9. What will the above Sum come to, for 9 Months? Answ. 18l. 0s. 7⅕d.

10. Caſt up the Intereſt of 580l. 15s. for 1 Year at 6 per Cent.? Answ. 34l. 16s. 10⅘d.

11. Tell me the Intereſt of 344l. 17s. 6d. for 1 Year, at the Rate of 6 per Cent.? Answ. 20l. 13s. 10⅕d.

—— III.

—— III. ——

12. What is the Intereſt of 340l. for 1½ Year, at 8 per Cent.? Answ. 40l. 16s.

Example.

l. 340
8
£. 27|20
20
s. 4|00

	l.	*s.*	*d.*
for 1 Year	27 :	4 :	0
½ Year	13 :	12 :	0
Answ.	40 :	16 :	0

13. Caſt up the Intereſt of 1000l. for 15 Months, at 8 per Cent.? Answ. 100l.

14. What will the above Sum come to, for 21 Months? Answ. 140l.

15. Tell me the Intereſt of 1090l. for 17 Months, at 8 per Cent.? Answ. 123l. 10s. 8d.

16. How much will the Intereſt of the foregoing Sum come to, for 23 Months? Answ. 167l. 2s. 8d.

17. What is the Intereſt of 150l. for 3½ Months, at 8 per Cent.? Answ. 3l. 10s.

18. Caſt up the Intereſt of 514l. for 1 Year 7½ Months, 8 per Cent.? Answ. 66l. 16s. 4⅘d.

—— IV. ——

19. How much is the Intereſt of 348l. 15s. for 18 Months, at 7 per Cent.? Answ. 36l. 12s. 4½d.

Example.

l. s.	l. s. d.
384 : 15	for 1 Year 24 : 8 : 3
7	for ½ Year 12 : 4 : 1½
£. 24|41 : 5	36 : 12 : 4½
20	
s. 8|25	
12	
d. 3|00	

20. At 8 per Ct. what will 468l. 16s. 8d. come to, for 1 Month? Answ. 3l. 2s. 6$\frac{2}{15}$d.

21. At 7 per Cent, tell me what will 3800l. 14s. 4d. come to, for 1⅓ Year? Answ. 354l. 14s. 8$\frac{4}{73}$d.

22. What will 3020l. come to, for 5½ Months, at 8 per Cent.? Answ. 110l. 14s. 8d.

23. How much is the Intereſt of 175l. 10s. 6d. for 1 Year, 7 Months, at 6 per Cent.? Answ. 16l. 13s. 5$\frac{97}{100}$d.

24. Caſt up the Intereſt of 886l. 16s. for 1 Year 11½ Months, at 8 per Cent.? Answ. 138l. 18s. 7$\frac{17}{25}$d.

—— V. ——.

25. How much is the Intereſt of 100l. from the 7th of May, to the 26th of September, at 8 per Cent.? Answ. 3l. 2s. 2$\frac{70}{73}$d.

Example.

May 24 *Days.*
June 30
July 31
Aug. 31
Sept. 26

d.	*l.*	
If 365	8	142 ?

ANSW. 3l. 2s. $2\frac{70}{73}$d.

26. What is the Intereſt of 100l. from the 4th of March to the 29th of September, at 7 per Ct.? ANSW. 4l. 0s. $1\frac{71}{73}$d.

27. At 6 per Cent. what will the Intereſt of 100l. be from the 5th of July to the 9th of January? ANSW. 3l. 1s. $9\frac{51}{73}$d.

28. Caſt up the Intereſt of 100l. at 8 per Cent. from the 6th of June to the 28th of December? ANSW. 4l. 9s. $10\frac{25}{73}$d.

29. Tell me the Intereſt of 100l. from the 10th of May to the 30th of Auguſt, at 8 per Cent? ANSW. 2l. 9s. $1\frac{11}{73}$d.

30. How much is the Intereſt of 100l. from the 3d of April to the 25th of February, at 7 per Cent? ANSW. 6l. 5s. $9\frac{51}{73}$d.

VI.

31. How much is the Intereſt of 175l. for 1 Year and 73 Days, at 8 per Cent.? ANSW. 16l. 16s.

Example.

l.	*l.*	*l.*		*l.*	*s.*
100	8	175	comes	14 :	0
ds.	*l.*	ds.			
365	14	73	comes	2 :	16
			ANSW. £.	16 :	16

Or thus,

l. l. l.
100 ＞ 8 ＜ 175
ds. ds.
365 438 Answ. 16l. 16s.

32. Caſt up the Intereſt of 240l. for 1 Year and 135 Days, at 7 per Cent.? Answ. 23l. 0s. 3$\frac{21}{73}$d.

33. What is the Intereſt of 371l. for 1 Year and 213 Days, at 6 per Cent.? Answ. 35l. 5s. 0$\frac{36}{1825}$d.

34. Tell me the Intereſt of 564l. for 1 Year, 335 Days, at 8 per Cent.? Answ. 86l. 10s. $\frac{41}{73}$d.

35. How much is the Intereſt of 150l. 15s. 6d. for 33 Days, at 7 per Cent.? Answ. 1l. 10s. 7$\frac{14753}{18250}$d.

—— VII. ——

36. A Merchant borrows at Intereſt 250l. at 8 per Cent. for 2 Years, with Condition to pay before the Time as much of the Principal as he pleaſes, now, at the Expiration of 2 Months, he pays 80l. and 6 Months after 70l. leaving the reſt the full Time, of the aforeſaid 2 Years; I would know how much, Principal and Intereſt, the Merchant is then to pay? Answ. 127l. 16s. 0d.

Example.

100 > 8 < 250 Intereſt.
12 > 8 < 9 comes 15l. 0s. 0d.

1200 2250 250
80
170

100 > 8 < 170
12 > 8 < 6 comes 6 : 16 : 0

170 21 : 16 : 0
70
100

100 > 8 < 100
12 > 8 < 9 comes 6 : 00 : 00

Intereſt 27 : 16 : 00
Principal 100 : 00 : 00

ANSW. £. 127 : 16 : 00

37. Suppoſe I borrow at Intereſt 300l. at 6 per Cent. for 18 Months, with Condition to pay as much of the Principal, before the Time; as I pleaſe; now after 3 Months Time I pay 60l. and 4 Months after that 100l. and 5 Months after that I pay 75l. I would know how much I have yet to pay for Principal and Intereſt at the Expiration of the ſaid 18 Months? ANSW. 79l. 15s. 0d.

38. Lent at Intereſt 600l. the 13th of May 1717, for 1 Year, at the Rate of 5 per Cent. with Condition that the Receiver may diſcharge as much of the Principal before the Time as he pleaſes; now he pays the 9th of July 200l. and the 17th of September 150l. I would know how much Principal

and Intereſt he is more to pay at the Expiration of the Year, counting it 365 Day? ANSW. 266l. 13s. $5\frac{7}{73}$d.

39. A. gives to B. at Intereſt, Anno 1717, primo Novembris, 6000l. at $4\frac{1}{2}$ per Cent. B. to repay him, with Intereſt, at the Expiration of 2 Years; having Liberty to pay before that Time as much of the Principal as he pleaſes; now B. pays

The 16th of December, 1717, — —	£. 900
The 11th of March — —	1260
The 30th of Ditto, — —	600
The 17th of Auguſt, — —	800
The 12th of February, 1719, —	1048

I would know how much Principal and Intereſt B. primo Nov. Anno 1719, is to pay? ANSW. 1642l. 9s. $2\frac{15546}{16875}$d.

CHAP. XXV.

Of INTEREST upon INTEREST.

SECT I.

WHAT will 500l. amount to for 3 Years, at 8 per Cent. Intereſt upon Intereſt? ANSW. 629l. 17s. $1\frac{11}{25}$d.

Example.

l. l. l. l. s.
If 100—108—500 comes 540 : 0 the 1ſt Year.
100—108—540 comes 583 : 4 the 2nd Year.
100—108—583 : 4 ANSW. 629 : 17 : $1\frac{21}{25}$ the 3d Year.

Or thus,

Prin. Int. Prin. Intereſt

If 100—8—500 comes 40 : 0 the 1ſt Year.

40

100—8—540 comes 43 : 4 the 2nd Year,

43 : 4

100—8—583 : 4 comes 46 : 13 : $1\frac{21}{25}$ the 3d Year.

Principal 500 : 00 : 0

ANSW. 629 : 17 : $1\frac{21}{25}$

Or thus,

l. *l.* *l.*

100—108—500

20

10000

12

120000

108

960000

1200000

~~1~~ the 1ſt Year 129600(00

~~3728~~(1 108

~~151168~~ 1259(7

~~12~~ 1036800

ANSW. 629 : 17 : $1\frac{21}{25}$ 1296000

2d Year 139968(00

108

1119744

1399680

3d Year 151165(44

SCHOLIUM.

☞ Although it be according to the Laws and Cuſtom of Ireland, to compute Intereſt at the Proportion of 6 per Cent. yet he that takes up Money at Intereſt for any Time leſs than even or compleat Years, pays more Intereſt than ſeems reaſonably due, according to the Rules of Art; as for Inſtance, if 100l. be forborn at Intereſt one whole Year, it amounts to 106l. but (I ſay) if it be repaid at the half Year's End, it ſhould not amount to 103l. as appears from this following Proportion.

Let $a=$ be the amount due at the half Year's End, then it will be $100 : a :: a : 106$ the Amount at the Year's End. Ergo, $aa = 10600$, and $a = \sqrt{10600} = 102,9563 =$ 102l. 19s. 1½d. which is leſs than 103l. by 10½d. and if it be paid in leſs than ½ a Year's Time, the Error muſt needs be the greater.

Mr. *Ward* places this Scholium at the end of his Chapter of Simple Intereſt, but it ſeems more properly to belong to Compound Intereſt: for if 100l. be forborn at Intereſt one whole Year, it amounts to 106l. but if it be repaid at the half Year's End, it amounts according to the Rules of Simple Intereſt laid down by *Ward*, to 103l. exactly; but according to the Rules of Compound Intereſt, laid down by the ſame Author, it amounts to 102l. 19s. 1½d. only, as Mr. *Ward* remarks.

The celebrated Mathematician *Philip Ronayne*, Eſq; obſerves, that although it be not lawful to let out Money at Compound Intereſt; yet, in purchaſing of Annuities or Penſions, &c. and taking Leaſes in Reverſion, it is very uſual to allow Compound Intereſt to the Purchaſer for his ready Money; and therefore it is very requiſite to underſtand it.

CHAP.

CHAP. XXVI.

Of BARTER.

SECT. I.

1. A Merchant barters 10 Pieces of Drugget, containing each 25 Yards, at 18½d. the Yard, against Pepper of 15d. the lb. how much Pepper muſt he receive? Answ. 308⅓lb.

Example.

10 Ps.
25
———
250
18½
———
2000
250
125
———
4625

(5
125
4625 } 308⅓ lb.
1555
11

2. A Merchant has 1000lb. of Sugar, which he barters at 9½d. the lb. againſt Tobacco at 10¼d. the lb. how much Tobacco muſt he receive? Answ. 926 34/41 lb.

3. A. gives to B. 250 Yards of Drugget, at 18½d. the Yard, for 308⅓lb. of Pepper, I demand at how much the Pepper ſtands him in the lb.? Answ. 15d.

4. A. has 1200 Stone of Tallow, at 2s. 3¼d. the Stone. B. has 110 tanned Hides, wt. 3994lb. at 5¾d. the lb. and they barter at theſe Rates, tell me how much Money A. is to receive of B. beſides the Hides? Answ. 40l. 11s. 2½d.

5. A. trucks Druggets of 18½d. the Yard againſt 308⅛ lb. of Pepper at 15d. the lb. how many Pieces of Drugget (every Piece 25 Yards) has he delivered? Answ. 10 Pieces.

—— II. ——

6. A. has Silk of 14s. per lb. B. has Cloth of 10s. per Yard, which he barters at 12s. 6d. the Yard, at how much muſt A. charge his Silk, to make his Profit equal with B? Answ. 17s. 6d.

Example.

s. *s.* *d.* *s.*
If 10—12 : 6—14 Answ. 17s. 6d.

Or thus,

s. *d.*
12 : 6
10 : 0
s. *s.* *d.* *s.*
If 10 ———— 2 : 6—14 comes 3 : 6
14 : 0
Answ. 17 : 6

7. A. has Coffee, which he barters with B. at 10d. per lb. more than it coſt him, againſt Tea which ſtands B. in 10s. the lb. but charges it at 12½s. I would know how much the Coffee coſt at firſt? Answ. 3s. 4d.

8. A. has 150 Barrels of Barley, which coſt him 5s. per Barrel, which he barters at 5s. 10d. with B. who has Wheat that coſt him 12s. the Barrel, at how much muſt B. charge his Wheat to gain in Proportion as much as A. and how many Barrels is he to deliver? Answ. 62½ Barrels at 14s.

9. Two Perſons barter, the one has Butter, which coſt him 28s. per Ct. the other has Beef which coſt 22s. 6d. per Barrel: now, they have both a Mind to gain 8 per Ct. tell me at how much they muſt charge their Goods? Answ. At 30s. $2\frac{22}{25}$d. per Ct. and at 24s. $3\frac{3}{5}$d. per Barrel.

10. A. and B. barter ſome Goods, A. charges his at $30\frac{6}{25}$s. and then he gains 8 per Cent. B. gains the ſame, for he charges his at $24\frac{3}{5}$s. let me know how much theſe Goods coſt at firſt? Answ. 28s. and 22s. 6d.

—— III ——

11. B. has 5 Tons of Butter at 25l. 10s. per Ton, and $10\frac{1}{2}$ Tons of Tallow at 33l. 15s. per Ton, which he barters with C. thus, to have 150l. 1s. 6d. in Money, and the reſt in Beef at 21s. per Barrel, how many Barrels is he to receive? Answ. 316 Barrels.

Example.

	l.	*s.*	*d.*
5 Tons at $25\frac{1}{2}$l. is	127	10	0
$10\frac{1}{2}$ Tons at $33\frac{3}{4}$l. is	354	7	6
l.	481	17	6
In Caſh,	150	1	6

s. Bar.

If 21 —— 1 —— 331 : 16 : 0 Answ. 316

12. A. has 5 Bales of Pepper, wt. neat 1600lb. at 17d. per lb. which he barters with B. for two Sorts of Goods, the one at 5d. the other at 8d. per lb. to have $\frac{1}{5}$ in Money, and of each Sort of Goods an equal Quantity. I demand how many

lb. of each Sort of Goods, and how much Money he is to receive? ANSW. $1394\frac{34}{39}$ lb. of each, and 37l. 15s. $6\frac{2}{3}$d. in Money.

13. Two Merchants barter, C. has 10 Hhds. of Madder, qt. neat, 90 Ct. 3qrs. 14lb. coſt 38s. 6d. per Ct. and charges it at 42s. per Ct. D. has Hemp which coſt 34s. 10d. per Ct. C. deſires $\frac{1}{4}$ in Money, the Reſt in Hemp; tell me how much Money and Hemp C. is to receive, alſo at how much D. muſt charge the Price of the Hemp, to make the Barter equal? ANSW. C. muſt receive 47l. 14s. $2\frac{1}{4}$d. and 75Ct. 1qr. $9\frac{1}{38}$lb. of Hemp, at the Rate of 38s. per Ct.

14. C. barters 10 Hhds. of Madder, qt. 90 Ct. 3qrs. 14lb. which he charges at 42s. per Ct. for which D. is to give him $\frac{1}{4}$ Part in Money, and the Reſt in Hemp, which coſt him 34s. 10d. per Ct. but charges it at 38s. what is the firſt coſt of the Madder, allowing C. raiſed his Price in Proportion to D. and how much Money and Hemp is C. to receive? ANSW. The Madder coſt 38s. 6d. per Ct. and C. is to receive 47l. 14s. $2\frac{1}{4}$d. in Money, and 75Ct. 1qr. $9\frac{1}{38}$lb. in Hemp.

IV.

15. I have Merchandizes, which coſt me 30s. per Ct. but charge them at 34s. he has Merchandizes which coſt him 25s. per Ct. and charges them at 28s. per Ct. and ſo we barter our Goods; now I want to know who has made the beſt Bargain, and by how much per Ct.? ANSW. I gain $1\frac{1}{3}$ per Ct. more than he.

Example.

If 30———4———100 Answ. $13\frac{1}{3}$
If 25———3———100 Answ. 12

Differs $1\frac{1}{3}$

16. A. and B. barter, A. has Cloth which coſt 28d. the Yard, but charges it at 32d. B. has Cloth coſt 22d. the Yard; tell me how high B. muſt charge his Cloth to gain 5 per Ct. more than A? Answ. $26\frac{17}{70}$d. per Ct.

17. A. and B. barter, A. has Cloth which coſt him 28d. the Yard, B.'s coſt 22d. and charges it at 25d. tell me how high A. muſt charge his to gain 10 per Ct. more than B? Answ. $34\frac{34}{55}$d.

18. C. and D. barter, C. makes of 7s. 6d. 8d. D. makes of 7s. 6d. 7s. 3d. I demand who has loſt moſt, and how much per Ct.? Answ. C. loſes $1\frac{3}{7}$ per Ct. more than D.

19. A. charges his Merchandizes from 3l. 10s. to 4l. 6s. B. charges his from 1l. 16s. to 2l. 4s. and ſo they barter. A. has a Mind to gain yet 10s. more. I demand how high B. muſt put his Price to make the Barter equal? Answ. 2l. $9\frac{13}{33}$s.

20. A. and B. barter, A. has Muſlin which coſt him 30s. the Piece, but has a mind to gain 10 per Ct. B. has Silk, which coſt 42s. per Piece; tell me at how much B. muſt charge his Silk to make the Barter equal? Answ. $46\frac{1}{5}$s.

21. A. has Sugar which coſt him 59s. 6d. per Ct. and has a Mind to gain 15 per Ct. B. has Oil which coſt 6s. 3d. per Gallon; at how much muſt B. charge his Oil to gain as much per Ct. as A.? Answ. At 7s. $2\frac{1}{4}$d.

— V. —

22. I have Cloth at 8d. the Yard, and in Barter charge it at 13d. and give 9 Months Time for the Payment, he has Goods which coſt 12d. per lb. and gives 6 Months Time for the Payment; tell me how high he muſt charge his Goods to make an equal Barter? Answ. At 17d.

NOTE. *Leſſen one Man's Profit according to the other Man's Time.*

Example.

13d.
8
———
m. *m.*
If 9 ——— 5 ——— 6 comes 3$\frac{1}{3}$
8
———
11$\frac{1}{3}$
d. *d.* *d.*
If 8——11$\frac{1}{3}$——12 Answ. 17d.

23. I and he barter our Goods, mine coſt 8d. per lb. but charge it at 13d. and give 9 Months Time, he charges his at 17d. and gives 6 Months Time; tell me how much his Goods coſt? Answ. 12d.

24. Two Perſons barter, A. has Sugar at 8d. per lb. but charges at 13d. and gives 9 Months, B. has Cocoa at 12d. per lb. and charges it at 17d. per lb. I demand how much Time B. muſt give to make the Barter equal? Answ. 6 Months.

25. A. and B. barter, A. has Goods which coſt 15s, which he charges at 20s. giving 6 Months Time. B. has Goods which coſt 1l. 10s. and charges them at 2l. 5s. I demand what Time he muſt give to make the Barter equal? Answ. 9 Months.

C H A P. XXVII.

FELLOWSHIP, OR COMPANY.

S E C T. I.

THIS *Rule teaches, when two, three, or more Merchants put together a general Stock in Trade, or are concerned in Ships, &c. to know how to find every Perſon's particular Share of the Loſs or Gain, in Proportion to his Principal in the joint Stock:*

Bankrupts Eſtates, Legacies, in Caſe of Deficiency of Effects, and many other Things of the like Nature, may alſo be adjuſted by this Rule, as the following Examples will ſufficiently ſhew:

1. A. and B. buy certain Merchandizes amounting to 80l. of which A. pays 30l. and B. 50l. and they gain by the ſaid Goods 20l. now I would know each Man's Share in the Profit, according to their Stock put in? ANSW. A. 7l. 10s. and B. 12l. 10s.

Rule.

Add each Man's Stock together, then as the whole Stock is to the whole Gain, ſo is each Man's particular Stock to each Man's particular Gain.

Example.

A. 30
B. 50

l. s.
If 80———20<30 ANSW. 7 : 10
50 ANSW. 12 : 10

20 : 00

2. A. and B. gained by Merchandizing, 182l. A. put in 300l. and B. 400l. I demand their Share of the Profits? Answ. A. 78l. and B. 104l.

3. Two Perſons are to ſhare 100l. of which, A. is to have $\frac{1}{2}$, and B. the $\frac{1}{4}$ Part. I demand what each juſtly ought to have? Answ. A. $66\frac{2}{3}$l. and B. $33\frac{1}{3}$l.

4. A Merchant being deceaſed, 'tis found he owes to A. 500l. and to B. 900l. though he left but 1100l. behind him. I demand how much each is to have in Proportion to his Debt? Answ. A. $392\frac{6}{7}$l. B. $707\frac{1}{7}$l.

5. B. and C. are left a legacy of 120l. of which B. is to have $\frac{1}{2}$ and C. the $\frac{1}{4}$, [illegible] tell me how much each is to have according to his Share in the ſaid 120l.? Answ. B. 80l. and C. 40l.

6. Three Merchants load a Ship with Corn, A. puts in 200 Barrels, B. 300, and C. 400 Barrels; at Sea the Maſter is obliged by Storm, to heave 180 Barrels over-board, tell me how much each Merchant ought to loſe for his Share? Answ. A. 40, B. 60, and C. 80 Barrels.

7. Two Cities, Cork and Dublin, Diſtance, ſuppoſe 100 Miles, A. ſets out from Dublin towards Cork, B. ſets out from Cork towards Dublin, A. goes 12 Miles a Day, and B. 8 Miles a Day. I demand how many Miles each has travelled when they meet? Answ. A. 60, and B. 40 Miles.

8. Two Merchants have gained 450l. of which A. is to have 3 Times as much as B. tell me how much is each to have? Answ. A. 337l. 10s. and B. 112l. 10s.

Example.

A. 3
B. 1

l. s.

If 4 —— 450 < 3 comes 337 : 10
1 comes 112 : 10

9. Three Perſons have to ſhare 600l. A. is to have a certain Sum, B. as much again as A. and C. three Times as much as B. I demand each Man's Part? Answ. A. 66$\frac{6}{9}$, B. 133$\frac{1}{3}$ and C. 400l.

10. Three Perſons are to pay a Tax of 100l. according to their Eſtates; now A. is found to be worth 800l. B. 600l. and C. 400l. how much is each of them to pay? Answ. A. 44$\frac{8}{18}$l. B. 33$\frac{6}{18}$l. and C. 22$\frac{4}{18}$l.

11. Three Perſons have gained 1320l. now when A. takes 6l. B. takes 4l. and C. 2l. I demand how much each gets? Answ. A. 660l. B. 440l. and C. 220l.

12. A. and B. have gained 600l. whereof A. takes 10 per Cent. more than B. I demand how much each receives? Answ. A. 314$\frac{6}{21}$l. and B. 285$\frac{15}{21}$l.

13. Three Perſons are to divide a Legacy of 600l. A. is to have $\frac{1}{2}$, B. $\frac{1}{3}$, and C. $\frac{1}{4}$. I demand each of their Shares? Answ. A. 276$\frac{12}{13}$l. B. 184$\frac{8}{13}$l. and C. 138$\frac{6}{13}$l.

14. Three Merchants formed a Company, A. put in 150l. and B. 260l. and they gained 65l. whereof C.'s Share came to 19l. I would know A. and B.'s Part of the Gain, and how much C. did put in? Answ. C. put in 169l. 6s. 11$\frac{22}{46}$d. A.'s Profit 16l. 16s. 7$\frac{1}{41}$d. B.'s Profit 29l. 3s. 4$\frac{40}{41}$d.

15. Three Perſons join, A. and B. put in a certain Stock, and C. puts in 1090l. they gain 110l. whereof A. took 35l. and B. 29l. tell me how much A. and B. put in, and C.'s Share of the Gain? Answ. C.'s Share of the Profit was 46l. A. put in 829l. 6s. 11$\frac{1}{23}$d. B. put in 687l. 3s. 5$\frac{5}{23}$d.

CHAP. XXVIII.

FELLOWSHIP WITH TIME.

SECT. I.

THREE Merchants formed a Company, A. put in 30l. for 4 Months, B. put in 20l. for 5 Months, C. put in 15l. for 6 Months, and with this Stock they gain 31l. I demand each Man's Share of the Gain? Answ. A. 12l. B. 10l. and C. 9l.

Rule.

Multiply each Man's Stock, by its Time, and the Products add together, then ſay, as the whole Stock and Time is to the whole Loſs or Gain, ſo is each Man's particular Stock and Time, to each Man's particular Loſs or Gain.

Example.

A. 30l.	B: 20l.	C: 15l.
m. 4	m. 5	m: 6
120	100	90

120
100
90

310 —— 31	120		12 for A.
	100	Answ.	10 for B.
	90		9 for C.
			31

2. Two Merchants made a Company, A. put in 100l. for 4 Months, and B. put in 136l. for 3 Months, and they gain 50l. I demand each Man's Share of the Profit? Answ. A. 24l. 15$\frac{5}{101}$s. and B. 25l. 4$\frac{96}{101}$s.

3. Three Graziers hired a Piece of Land for 60l. 10s. A. put in 5 Oxen for 4½ Months, B. put in 8 Oxen for 5 Months, and C. put in 9 Oxen for 6½ Months. I demand how much each muſt pay? Answ. A. 11l. 5s. B. 20l. and C. 29l. 5s.

4. Three Perſons have received 665l. Intereſt, A. had put in 4000l. for 12 Months, B. 3000l. for 15 Months, and C. 5000l. for 8 Months; how much is each Man's Part of the Intereſt? Answ. A. 240l. B. 225l. and C. 200l.

5. Three Perſons hired a Piece of Land for 12l. 10s. 6d. A. put in 20 Sheep for 5 Days, B. put in 16 Sheep for 7 Days, and C. put in 25 Sheep for 4 Days. I demand how much each muſt pay? Answ. A. 4l. 0s. 3$\frac{6}{13}$d. B. 4l. 9s. 11$\frac{1}{13}$d. and C. 4l. 0s. 3$\frac{6}{13}$d.

6. Three Merchants loſt by ſome Dealings 45l. 10s. A.'s Stock was 100l. for 6½ Months, B.'s 100l. for 9½ Months, and C.'s 150l. for 8⅔ Months; what is each Man's Part of the Loſs? Answ. A. 10l. 3$\frac{28}{29}$s. B. 14l. 18s. 1$\frac{7}{29}$d. and C. 20l. 7$\frac{27}{29}$s.

7. Three Merchants put in a Stock, viz. A. puts in the 1ſt of January 120l. until the 23d of March, B. puts in 176l. the 10th of February until the 12th of April, C. puts in 295l. the 2d of February, until the 25th of April, and they gain 800l. I want to know each Man's Part of the Gain, allowing 28 Days to the Month of February? Answ. A. 174l. 3s. 4$\frac{37200}{44646}$d. B. 192l. 7s. 6$\frac{6180}{44646}$d. C. 433l. 9s. 1$\frac{1266}{44646}$d.

8. Four Perſons hired a Boat for 19s. to go 24 Miles, but being come within 9 Miles of the Place where they intended to go, there came 2 Perſons who deſired to come into the Boat, with Condition to pay proportionably; tell me how much each of them is to pay? Answ. The 4 firſt Perſons 16s. and the two laſt 3s.

9. Four Perſons hired a Coach to go 90 Miles for 40s. now when they were gone 20 Miles they met two Perſons who deſired to come in the Coach, with Condition, to pay proportionably; how much is each of them to pay? Answ. The 4 firſt Perſons 1l. 10s. 9$\frac{1}{13}$d. and the 2 laſt 9s. 2$\frac{1}{13}$d.

CHAP. XXIX.

LOSS AND GAIN.

SECT. I.

BOUGHT a Piece of Cloth, 53 Yards long, at 12s. the Yard, ſold the ſame at 14s. the Yard, what is the Profit on the whole Piece? Answ. 5l. 6s.

Example.

s. 14 ſold
s. 12 bought

2
53

10|6

£. 5 : 6

2. If 1 lb. of Pepper coſt 15d. and ſold for 17d. what is the Profit upon 3 Bales, weight 980 lb.? Answ. 8l. 3s. 4d.

3. Bought a Piece of Cloth 53 Yards long, for 31l. 16s. and ſold it at 14s. the Yard. I demand what is gained by the whole Piece? Answ. 5l. 6s.

4. If 980 lb. of Merchandizes are bought for 61l. 5s. and ſold for 69l. 8s. 4d. I demand the Profit upon each lb.? Answ. 2d.

5. Bought 12 Hhds. of Wine, at 10l. 5s. the Hhd. paid for Cellarage and other Charges 4s. 6d. per Hhd. ſold the Hhd. for 37 Crowns, each at 5s. 5d. I demand Profit or Loſs? Answ. 5l. 9s. Loſs.

6. A Merchant buys 100 Caſks of Butter, wt. neat 210Ct. 2qrs. 14lb. at 20s. per Ct. pays for ſundry Charges 1l. 5s. I demand his Profit if he ſells the Butter at 21s. 9d. per Ct.? Answ. 17l. 3s. 7⅛d.

—— II. ——

7. If 1 Ton of Tallow coſt 20l. and is ſold for 22l. 10s. I demand how much is the Profit per Cent.? Answ. 12½.

Example.

$$\begin{array}{ccccc} & & 22\tfrac{1}{2} & & \\ & & 20 & & \\ l. & & \overline{} & & l. \\ 20 & \text{———} & 2\tfrac{1}{2} & \text{———} & 100 \end{array}$$ Answ. 12½

8. If I buy 1 lb. of Gloves for 6s. 3d. and ſell it for 6s. how much per Ct. Loſs is it? Answ. 4 per Cent.

9. Bought 1000 Barrels of Wheat, at 10s. per Barrel, paid for divers Charges 10l. how much per Cent. is gained if the Wheat is ſold at $11\frac{1}{4}$ per Barrel? Answ. $10\frac{5}{17}$ per Cent.

10. Sold certain Merchandizes for 520l. and find to have made 120l. Profit. I demand how much per Cent. it is? Answ. 30l.

11. If 1lb. of Pepper is ſold for $10\frac{1}{2}$d. and there is loſt 2d. per lb. how much is the Loſs per Cent.? Answ. 16 per Cent.

12. When I ſell 1lb. of Silk for 26s. 6d. I gain 2s. 6d. now I want to know how much I ſhould gain if I ſold a Bale of Silk which coſt 120l.? Answ. 12l. 10s.

—— III. ——

13. Bought 100 Oranges at the Rate of 6 for $4\frac{1}{2}$d. and ſold them at the Rate of 5 for 3d. tell me how much Money is loſt, and how much is the Loſs per Cent.? Answ. Loſt 15d. or 20 per Cent.

Example.

Oran. *d.* *Oran.* *d.*

If 6——$4\frac{1}{2}$——100 comes 75 bought

If 5——3——100 comes 60 ſold

15 loſt

d. *loſt* *d.*

75——15——100 Answ. 20 per Cent.

14. If 5 Lemons are bought for 4d. and 4 Lemons are ſold for 5d. how much is the Profit upon the Box containing 200 Lemons, and how much is it per Cent.? Answ. 7s. 6d. is $56\frac{1}{4}$ per Cent.

15. Suppoſe 6 Yards of Ribbon coſt 28d. and are ſold at 5¼d. the Yard, what is the Profit at that Rate upon a Piece of 54 Yards? Answ. 2s. 7½d.

16. Bought Coffee at the Rate of 21s. for 7lb. ſold it at 3s. 4d. the lb. how much is the Profit, at that Rate, upon a Bale, wt. 346lb. and how much do I gain per Cent.? Answ. 11⅑ per Cent. or 5l. 15s. 4d.

— IV. —

17. A Piece of Serge 53 Yards long, coſt 5l. 1s. 7d. for how much muſt one Yard be ſold to gain by the whole Piece 1l. 2s. 1d.? Answ. At 28d.

Example.

l. *s.* *d.*
5 : 1 : 7
1 : 2 : 1

yd. ——— yd.
If 53 — 6 : 3 : 8 — 1 Answ. 28d.

18. If 1 Yard of Serge coſt 23d. for how much muſt a Piece, containing 53 Yards, be ſold to gain 5d. a Yard? Answ. For 6l. 3s. 8d.

19. How much would the former Piece of Serge come to, if it was ſold at 3d. per Yard loſs? Answ. 4l. 8s. 4d.

20. If 112lb. of Sugar coſt 2l. 15s. and are ſold for 2½d. per lb. Profit, how much muſt be received for the 112lb. Answ. 3l. 18s. 4d.

21. Suppoſe the above Sugar was ſold for ¾d. per lb. Loſs, how much will then be received? Answ. 2l. 8s.

22. If 1lb. of Pepper coſt 15d. for how much muſt 1lb. be ſold to gain upon 30l. as much as 5lb. coſt? Answ. 17½d.

—— V. ——

23. If 1 Ton of Wine coſt 40lb. for how much muſt it be ſold to gain 6¼ per Cent.? Answ. 42l. 10s.

Example.

100
6¼
—————
If 100 —— 106¼ —— 40 comes 42 : 10 (l. s.)
Or thus,
If 100 —— 6¼ —— 40 comes 2 : 10 (l. s.)
40 : 00
—————
Answ. 42 : 10

24. At what Rate muſt I ſell 1 Ct. wt. of Madder, which coſt 3l. 15s. to gain 10 per Cent.? Answ. 4l. 2s. 6d.

25. At what Rate muſt the aforeſaid Madder be ſold to loſe 10 per Cent.? Answ. 3l. 7s. 6d.

26. Bought 12 Pieces of white Cloth, for 6l. 10s. per Piece, paid 20s. 10d. per Piece, for dying; for how much muſt I ſell them a Piece to gain 20 per Cent.? Answ. 9l. 1s.

27. For how much muſt I ſell the aforeſaid Cloth a Piece, if I had a mind to gain upon the 12 Pieces 100 Crowns of 5s. 5d. each? Answ. 9l. 15s. 11⅔d.

28. Suppoſe 900lb. of any Thing, coſt 67l. 10s. at what Rate muſt it be ſold per lb. to gain 2d. per lb.? Answ. 20d.

—— IV.

—— VI. ——

29. Bought 1 Ton of Wine, for 50l. ready Money, ſold it for 54l. 10s. payable in 8 Months Time, I demand how much per Cent. I gain at that Rate per Annum? Answ. 13½ per Cent.

Example.

54½
£ 50
————
50 > 4½ < 100
8 >   < 12
————
400   1200 Answ. 13½ per Cent.

30. Suppoſe I bought Rice for 3l. 15s. ready Money, and ſold it for 4l. 6s. 3d. payable in 18 Months, how much per Cent. do I gain at that Rate per Annum? Answ. 10 per Cent.

31. If 1 Ton of Tallow is bought for 23l. 6s. 8d. ready Money, and ſold for 24l. 10s. payable in 9 Months, tell me how much is the Profit per Cent. in 12 Months? Answ. 6⅔ per Cent.

32. What is the Profit per Cent. in 12 Months upon 300lb. of Coffee, which coſt 4s. 2d. the lb. ready Money, and ſold for 5s. per lb. payable in 8 Months? Answ. 30 per Cent.

33. A Linen Draper buys 20 Pieces of Linen, each containing 45 Yards, at 60s. per Piece for ready Money, ſells them at 16d. per Yard, payable in 6 Months, how much is the Profit or Loſs? Answ. He loſes the Uſe of his Money for 6 Months.

—— VII. ——

34. Bought 100 Caſks of Raiſins at 50s. per Ct. payable in 9 Months, ſold them for 52s. per Ct.

payable in 15 Months, what is the Profit per Cent. per annum, at that Rate? Answ. 8 per Cent.

Example.

15 m.		52s.		
9 m.		50		
6 m.	s.	50	2	100
	m.	6		12
		300		1200 Answ. 8 per Cent.

35. A Vintner buys a Parcel of Brandy at 5s. 3d. per Gallon, payable in 6 Months, ſells the ſame at 5s. 10$\frac{1}{2}$d. per Gallon, payable in 10 Months; how much per Cent. does he gain at that Rate per Annum? Answ. 35$\frac{5}{7}$ per Cent.

36. If 1 Hundred wt. of Merchandizes are bought for 56s. payable in 9 Months Time, and ſold for 6$\frac{1}{4}$d. the lb. payable in 12 Months Time, I demand what is gained per Cent. in a Year at that Rate? Answ. 16$\frac{2}{3}$.

37. A Tobacconiſt buys 10 Hhds. of Tobacco, wt. neat 30Ct. 3qrs. 14lb. at 9$\frac{1}{4}$d. per lb. payable in 3 Months, ſells it for 11d. half Farthing, payable in 7 Months, tell me how much per Cent. per Annum, he gains at that Rate? Answ. 60$\frac{30}{37}$.

—— VIII. ——

38. Received from London 11300lb. of Pewter, coſt 706l. 5s. Engliſh Money, the Charges here are 10l. 6s. 8d. at what Rate muſt I ſell it per lb. to gain 15 per Cent. allowing 12d. in England, to make 13d. in Ireland? Answ. 19d. very near, or exactly 18$\frac{42083}{452000}$d.

Example.

d. *d.* *l.* *s.* *l.* *s.* *d.*

12—13—706 : 5 comes 765 : 2 : 1
Charges 10 : 6 : 8

The whole Coſt 775 : 8 : 9
100——15—775 : 8 : 9 comes 116 : 6 : $3\frac{3}{4}$

£. 891 :: 15 : $0\frac{3}{4}$

lb. *l.* *s.* *d.* *lb.*

11300——891 : 15 : $0\frac{3}{4}$—1 Answ. $18\frac{42483}{45200}$d.

39. A Merchant receives from Liſbon 180 Caſks of Raiſins, which ſtand him here in 16s. each, trucks them againſt other Merchandizes at 28s. per Ct. finds to have made 25 per Ct. Profit. I demand the weight of each Caſk one with another? Answ. 80lb.

40. I ſell Barley at 6s. per Kilderkin, and gain 20 per Ct. now if I ſell a Parcel of the ſame Barley amounting to 3l. 15s. and find to gain 50 per Ct. tell me how many Barrels were in the laſt Parcel? Answ. 10——And at what Rate I ſold them? Answ. At $7\frac{1}{2}$s.

41. Received 3 Pieces of Holland, qt. No. 1, 42 Ells, at $15\frac{3}{4}$ Stivers the Ell, No. 2, 52 Ells, at $19\frac{3}{8}$ Stivers the Ell, No. 3, $64\frac{1}{2}$ Ells, at $20\frac{1}{2}$ Stivers the Ell. At how much muſt I ſell it a Yard, one with another, to gain 20 per Ct. allowing $10\frac{1}{2}$ Stivers for 1s. Sterling, and 3 Yards making 4 Ells? Answ. 2s. $10\frac{1267}{12093}$d.

——IX.——

42. A Merchant ſends to Barbadoes 300 Firkins of Butter, weight 175Ct. 2qrs. 19lb. at 18s. 8d. per Ct. pays for Duty and other Charges 11l. 0s.

10d. his Correſpondent at Barbadoes ſells the Butter at 6d. per lb. (wt. as above) pays for Freight, &c. 24l. 17s. 1d. takes 5 per Cent. for his Commiſſion. I demand Loſs or Gain, if 135l. Barbadoes are worth but 100l. in Ireland? Answ. 152l. 14s. $5\frac{12}{17}$d. Profit.

Example.

Ct. *qrs.* *lb.* *l.* *s.* *d.*
175 : 2 : 19 at 18s. 8d. per Ct. 163 : 19 : 2
Charges——11 : 00 : 10

Firſt Coſt—175 : 00 : 00

Ct. *qrs.* *lb.*
175 : 2 : 19 at 6d. the lb. 491 : 17 : 6.
Charges——24 : 17 : 1
Commiſſion 24 : 11 : $10\frac{1}{2}$
——————£ 49 : 8 : $11\frac{1}{2}$

The neat Proceeds 442 : 8 : $6\frac{1}{2}$

l. *l.* *l.*
If 135—100—442 : 8 : $6\frac{1}{2}$ comes 327 : 14 : $5\frac{12}{17}$
The firſt Coſt 175 : 00 : 0

Profit 152 : 14 : $5\frac{12}{17}$

43. Sent to Rotterdam 500 Salt Ox-hides, wt. neat 400Ct. 2qrs. 14lb. coſt 20s. 4d. per Ct. paid for Duty and other Charges 15l. 10s 3d. when the Hides arrived they weighed 39370lb. and my Correſpondent ſells them for 15 Gilders the 100lb. deducts for Freight and other Charges 650 Gilders $17\frac{4}{5}$ Stivers, and for his Commiſſion 2 per Cent. Now tell me whether I gain or loſe, if I value each Gilder at 2s.? Answ. I gain 90l. 16s. $8\frac{1}{2}$d.

44. A Merchant ſends to Bourdeaux 200 Barrels of Beef, which coſt him 20s. per Barrel, and 400 Caſks of Butter, wt. neat 600Ct. 2qrs. 0lb.

at 20s. 4d. per Ct. pays for Duty and other Charges 45l. 10s. 6d. the Correſpondent in Bourdeaux ſells the Beef for 16 Livres the Barrel, and the Butter for 20 Livres, the 100lb. (wt. 67850) deducts for Charges 1500 Livres, and 2 per Cent. for his Commiſſion, now if the Merchant values each Livre at 16d. I would know whether he gains or loſes? Answ. He gains 139l. 12s. 1⅗d.

45. A Merchant in Ireland ſent to Liſbon 500 Barrels of Wheat, coſt 10½s. per Barrel, 200 Firkins of Butter, wt. 110Ct. 2qrs. 14lb. at 18s. 8d. per Ct. and 400 tanned Hides, weight 106Ct. 3qrs. at 5¼d. per lb. paid for Duty and other Charges 35l. 16s. 1d. and pays Premium of Inſurance of 688l. at 16 per Ct. the wheat at Liſbon meaſured 5000 Alquires, and is ſold at 300 Res the Alquire, the Butter wt. 387 Arobes * and 6lb. and is ſold at 80 Res the lb.—The Leather wt. 37¾ Arobes and 10lb. and ſells for 250 Res the lb. the Factor pays for Duty and other Charges 832 ℔. 062 Res, and charges for his Commiſſion 3 per Cent. The Factor remits the neat Proceeds to London, at 5s. 6d. per Milres, and the Merchant, in Ireland, draws it from London, at 5 per Cent. advance; I demand whether he gains or loſes by this Cargo? Answ. He gains 56l. 14s. 6d.

46. A Merchant in Ireland, ſends to Oſtend 20 Hhds. of Tallow, wt. 10 Tons, 17Ct. 3qrs. at 30l. 10s. 9d. the Ton, pays for Duty and other Charges, 25l. 10s. and for Premium of Inſurance 55l. 10s. the Tallow arriving at Oſtend, wt. 24388lb. and the Merchant there ſells it at 18 Gilders the 100lb. pays for Freight, Duty and other Charges 595 Gilders, 10 Stivers, 4 Pennings, and charges for his Commiſſion 2 per Cent. and remits the neat

* *Note, every Arobe is 32lb.*

Proceeds to London, at 33s. 9d. Flemiſh per l. Sterling, and the Iriſh Merchant draws it from London, at 4 per Ct. advance: I would know whether he gains or loſes? Answ. He loſes 32l. 15s. $1\frac{166420}{1130060}$d.

CHAP. XXX.

REBATE, OR, DISCOUNT.

SECT. I.

WHEN *Merchants ſell their Commodities upon Time, and afterwards both Parties do agree that this Money ſhall be paid in, before it be due, allowing at the Rate of a certain Intereſt, per Annum, this Allowance is called Rebate or Diſcount, and the Money ſo paid or received, before due, being put out to Uſe (at the Rate of the Diſcount agreed on until the Time it was due) muſt amount to the juſt Sum that would be then due.*

1. A Merchant buys certain Merchandizes, to the Value of 648l. payable in 12 Months, I would know how much ready Money he is to pay, the Rebate at 8 per Ct. per Annum? Answ. 600l.

Example.

l. 100
8

—— l. l. l.

If 108—100—648. Answ. 600 ready Money.

48 Rebate

——

648l.

2. How much is the Rebate of 7080l. 15s. in 12 Months, at 8 per Ct. per Annum? Answ. 524l. 10s.

3. How much is the Rebate of 100l. for 12 Months, at 8 per Ct. per Annum? Answ. 7l. 8s. $1\frac{7}{9}$d.

4. I demand how much ready Money I must pay for 432l. 14s. for 12 Months, Rebate at 7 per Ct. per Annum? Answ. 404l. 7s. $10\frac{22}{107}$d.

5. What is the Rebate of 45l. 15s. 6d. for 12 Months, at 6 per Ct. per Annum? Answ. 2l. 11s. $9\frac{45}{53}$d.

—— II. ——

6. How much is the Rebate of 530l. in 9 Months, at 8 per Ct. per Annum? Answ. 30l.

Example.

m. *p. Ct.* *m.*
If 12 —— 8 —— 9 comes 6
100
―――
If 106 — 6 — 530 Answ. 30l.

7. How much is the Rebate of 308l. 15s. in 18 Months, at 8 per Ct. per Annum? Answ. 33l. 1s. $7\frac{2}{7}$d.

8. Tell me the Rebate of 112l. 12s. in 20 Months, at 7 per Cent. per Annum? Answ. 11l. 15s. $3\frac{27}{67}$d.

9. One is indebted 273l. 10s. payable in 21 Months, I demand how much ready Money he is to pay, the Rebate at 6 per Cent. per Annum? Answ. 247l. 10s. $2\frac{15}{221}$d.

Proceeds to London, at 33s. 9d. Flemiſh per l. Sterling, and the Iriſh Merchant draws it from London, at 4 per Ct. advance: I would know whether he gains or loſes? Answ. He loſes 32l. 15s. $1\frac{166420}{1350000}$d.

CHAP. XXX.

REBATE, OR, DISCOUNT.

SECT. I.

WHEN Merchants ſell their Commodities upon Time, and afterwards both Parties do agree that this Money ſhall be paid in, before it be due, allowing at the Rate of a certain Intereſt, per Annum, this Allowance is called Rebate or Diſcount, and the Money ſo paid or received, before due, being put out to Uſe (at the Rate of the Diſcount agreed on until the Time it was due) muſt amount to the juſt Sum that would be then due.

1. A Merchant buys certain Merch
the Value of 648l. payable in 12
know how much ready Money
bate at 8 per Ct. per Annur

l. 100
8

If 108

— IV. —

15. A Merchant is indebted 2163l. 3s. payable in 12 Months. I demand how much he muſt pay, if he pays it at the Expiration of 5 Months, diſcounting at the Rate of 6 per Ct. per Annum? Answ. 2090l.

Example.

m.
12
5
—
m.
If 12—6—7, comes 3½
100
———
l. *s.*
If 103½——100——2163 : 3
———
Answ. 2090l.

16. If the aforeſaid Sum was paid in 3 Months, how much ought he then to pay Rebate, as before? Answ. 2070l.

17. A Merchant owes 110l. payable in 20 Months, and 224l. payable in 24 Months, the firſt Sum he pays in 5 Months, and the other one Month after that, diſcounting at 8 per Ct. per Annum. I demand the Sum he paid? Answ. 300l.

18. A. is to pay the 7th of April, 1793, 5927l. and the 19th of June afterwards 5989l. how much is he to pay if he pays both theſe Sums the 24th of January, 1793, diſcounting at the Rate of 16 per Ct. per Annum? Answ. 11371l. 19s. 6$\frac{1994}{5719}$d.

CHAP.

CHAP. XXXI.

ALLIGATION MEDIAL.

SECT. I.

ALLIGATION MEDIAL teaches how to find a Mean in the Price, Quantity, or Quality relating to the Mixture of Merchandizes, as Corn, Wine, Metals, Medicines, &c. one with another.

1. A Goldſmith has 18lb. of Silver Bullion, of 8 Ounces fine, melts that with 24lb. of Bullion of 10 Ounces fine. I demand how fine each lb. of the Mixture is? ANSW. $9\frac{1}{7}$ Ounces.

Rule.

As the Sum of all the Quantities is to the Sum of their Rates, ſo is any Part of the Mixture to the mean Rate, or Price.

Example.

lb. oz. oz.
18 of 8 —— 144
24 of 10 —— 240
—— ——
lb.
If 42 —————— 384 —————— 1 ANSW. $9\frac{1}{7}$ oz.

2. There are melted and mixed together, two Sorts of Silver, one Sort is worth 5s. and the other 4s. an Ounce, and there were 4 Ounces of the firſt, and 8 Ounces of the latter, what is the Value of one Ounce of this Mixture? ANSW. 4s. 4d.

3. Suppoſe 100lb. of Tobacco of $10\frac{1}{2}$d. the lb. and 80lb. of 9d. the lb. and 60lb. of $9\frac{1}{2}$d. the lb.

are mixed together. I demand what 1lb. of this Mixture is worth? Answ. $9\frac{3}{4}$d.

4. A Druggiſt has 200lb. of Ginger at 6d. the lb. 300lb. of 7d. the lb. and 400lb. of 8d. the lb. now if he mixes them together, what will 1lb. coſt? Answ. $7\frac{2}{9}$d.

5. 100 Caſks of Butter, qt. 200Ct. 3qrs. 14lb. at 18s. 8d. per Ct. are mixed with 150 Caſks, qt. 306Ct. 1qr. 7lb. at 28s. per Ct. and with 200 Caſks, qt. 420Ct. 3qrs. at 23s. 4d. per Ct. I demand what 1Ct. of ſaid Butter ſtands in? Answ. 23s. $10\frac{119}{303}$d.

6. A Goldſmith melts 8lb. $5\frac{1}{2}$ Ounces of Gold Bullion of 14 Caracts fine, with 12lb. $8\frac{1}{2}$ Ounces of 18 Caracts fine. I demand how many Caracts fine this Mixture is worth? Answ. $16\frac{51}{127}$ Caracts.

7. A Refiner has 10lb. of Gold, of 20 Caracts fine, melts it with 16lb. of 18 Caracts fine, the Queſtion is, how much Alloy muſt be put to it to make it 22 Caracts fine? Answ. 'Tis not fine enough by $3\frac{3}{13}$ Caracts, ſo no Alloy muſt be put to it, but more Gold.

CHAP. XXXII.

ALLIGATION ALTERNATE.

SECT. I.

ALLIGATION ALTERNATE *ſhews the due Proportion of Ingredients in any Mixture when the particular Rates of the Ingredients and mean Rates are given, being (as it were) the Converſe to Alligation Medial; and admits of three Caſes.*

Caſe 1. *The particular Rates* of any Ingredients propoſed to be mixed, and the *Mean Rate* of the whole Mixture being given, to find how much of each Ingredient is requiſite to compoſe the *Mixture*, when the whole Quantity, or any Part thereof is not *limited.*

1. How much Wheat at 6s. the Buſhel, and Barley at 3s. 8d. the Buſhel, will make a Mixture that may ſtand in 4s. 4d. the Buſhel? Answ. 8 Buſhels of Wheat, and 20 Buſhels of Barley.

Rule. *Take the Difference between the Mean Rate, and the particular Rates, and ſet them down alternately, and they will be the Quantity required.*

		Extre. Pri.	Alt. diff.	Proof.
	d.	72	8 Buſh. at 72d.	is 576
Mean Pri	52	d.		
		44	20 Buſh. at 44d.	is 880
			28 Buſh. at 52d.	is 1456

NOTE. *The Queſtions in this, and all the other Sections, except the 4th and 7th, admit of more Anſwers than one, and yet all true; for although in the foregoing Queſtion, 8 and 20 do anſwer it, yet there are many other Numbers that are in Proportion to one another, as 8 to 20, that will anſwer the Queſtion; and tho' common Arithmetick will not obtain all the poſſible Anſwers which the Queſtions in thoſe Sections are capable of, nor often thoſe which beſt ſuit the Purpoſe; yet by an algebraic Way of Reaſoning may be obtained all the poſſible Anſwers to any Queſtion in this Rule.*

2. How much Tobacco of 7½d. the lb. and 9¾d. the lb. muſt be mixt, ſo that it will ſtand in 8½d. the lb.? Answ. 1¼lb. at 7½d. and 1lb. at 9¾d.

3. What Quantity of Sugar, at 11d. the lb. and 7½d. the lb. would make a Mixture, ſo that it would ſtand in 10½d. the lb.? Answ. 3lb. at 11d. and ½lb. at 7½d.

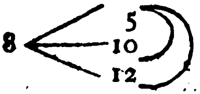
4. How many oz. of Silver of 11 oz. fine, and 8 oz. fine, muſt be melted together to make the Maſs or Mixture 9 oz. fine? Answ. 1 oz. of 11 oz. fine, and 2 oz. of 8 oz. fine.

— II. —

5. A Merchant has Sugar of 5d. 10d. and 12d. the lb. how much of each Sort muſt he take that he may ſell a lb. for 8d.?

Rule.

Join the ſingle Extreme to all the other Extremes, and proceed as before.



	Anſw.	*Proof.*
4 and 2 is 6	at 5d. is	30d.
3	at 10d.	30d.
3	at 12d.	36d.
lb. 12	at 8d.	96d.

6. How much Sack of 6s. the Gallon, and white Wine of 4s. the Gallon, and Sherry of 4s. 9d. the Gallon, would be wanted to make a Mixture, ſo that a Gallon may ſtand in 4s. 6d.? Answ. 6 Gallons at 6s. and 6 Gallons at 4s. 9d. and 21 Gallons at 4s.

7. A Merchant has Wheat of 5s. 10d. the Buſhel, and Barley of 4s. 2d. the Buſhel, and Rye of 3s. the Buſhel, how many Buſhels of each Sort muſt he

take to make a Mixture, ſo that the Buſhel may ſtand in 5s. 5d.? Answ. 44 at 5s. 10d. 5 at 4s. 2d. and 5 at 3s.

8. A Vinter has Brandies at 3, 5 and 6s. the Gallon, and has a Mind to mix a Quantity of them together, ſo that it may ſtand him in 5s. 6d. the Gallon; I demand how many Gallons he muſt take of each Sort? Answ. ½ at 3s. ½ at 5s. and 3 at 6s.

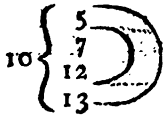
—— III. ——

9. A Grocer had Sugar of 5d. 7d. 12d. and 13d. the lb. and mixt of each a certain Quantity together, and found it ſtood him in 10d. the lb. I demand how many lb. he took of each Sort? Answ, 3lb. of 5d. 2lb. of 7d. 3lb. of 12d. and 5lb. of 13d. Or otherwiſe,

Rule.

Join two Extremes together, no Matter which, ſo that one may be larger than the Mean, and the other leſs, and ſet their Differences down, as before.

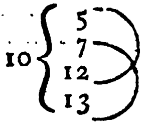
Example.



Proof.

		l.	s.	d.
Answ. 3lb. at 5d.	is	0	1	3
2lb. at 7d.	-	0	1	2
3lb. at 12d.	-	0	3	0
5lb. at 13d.	-	0	5	5
13lb. at 10d.	is £	0	10	10

Or thus, Proof.



	l.	s.	d.
Answ. 2lb. of 5d. is	0	0	10
3lb. of 7d. —	0	1	9
5lb. of 12d. —	0	5	0
3lb. of 13d. —	0	3	3
13lb. at 10d. is £.	0	10	10

10. A Wine Merchant has 4 Sorts of Wines, viz. of 20d. 16d. 12d. and 7d. the Quart, how much of each Sort muſt he take to ſell a Quart for 14d.? Answ. 6 Quarts of 7d. 2 Quarts of 12d. 2 Quarts of 16d. and 7 Quarts of 20d. or otherwiſe.

11. A Goldſmith has Gold of 17, 18, 22, and 24 Caracts fine, how much muſt he take of each to make it 21 Caracts fine? Answ. 3 Caracts of 17, 1 Caract of 18, 3 Caracts of 22, and 4 of 24 fine.

——— IV. ———

Caſe 2, called *Alligation partial, the particular Rates* of all the Ingredients propoſed to be mixed, the *Main Rates* of the whole Mixture, and any one of the Quantities to be mixed, being given, thence to find how much of every one of the other Ingredients is requiſite to compoſe the *Mixture.*

12. A Refiner has Silver Bullion of 9 oz. fine, I demand how much Alloy muſt be put to it to bring it to 7 oz. fine? Answ. $3\frac{3}{7}$ oz.

NOTE, *Set down all the Particulars and find their Differences as before, without any Regard to the Maſs* *or Quantity to be mixt, which here is* 12, *becauſe a Pound or* 12 oz. *of Silver being tried a certain Time in the Fire, loſing nothing in Weight, is eſteemed* 12 oz. *fine, but if it loſes* 3 oz. *'tis called* 9 oz. *fine, and if it loſes* 2 oz. *it is called* 10 oz. *fine, &c.*

RULE.

As the Difference ſtanding againſt the Quantity given, is to the Quantity or Mixture given, ſo is any other Difference to the Quantity ſought.

Example.

Note the (o) *ſtands here for Alloy.*

$7 \begin{cases} 0 \\ 9 \end{cases} \left| \begin{array}{l} 2 \\ 7—12—2 \end{array} \right.$ ANSW. $3\frac{3}{7}$

Proof.
Silver 9 oz.
Alloy 3 oz.

12
Alloy added $3\frac{3}{7}$

If $15\frac{3}{7}$—9—12 comes 7 oz

13. How much Alloy muſt be put to Bullion of $10\frac{4}{5}$ oz. fine, to bring it to $7\frac{1}{4}$ oz. fine? ANSW. $5\frac{127}{145}$ oz.

14. How much Alloy muſt be put to Gold of $21\frac{5}{6}$ Caracts to bring it to $17\frac{1}{2}$ Caracts fine? ANSW. $55\frac{33}{35}$ Caracts.

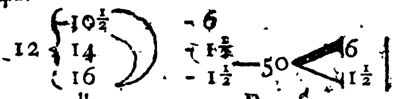
Note, *An Ounce of Gold being tried in the Fire, loſing nothing in Weight, is called* 24 *Caracts fine, but if it loſes* 3 *Caracts, 'tis called* 21 *Caracts fine, and if it loſes* 4, *'tis called* 20 *Caracts fine, &c.*

15. How much Water muſt I mix with 63 Gallons of Brandy of 5s. 5d. the Gallon, ſo that it may ſtand in 4s. 6d. the Gallon? Answ. $12\frac{5}{6}$ Gallons.

16. How much Wheat of 6s. the Buſhel muſt be mixed with 12 Buſhels of Barley, of 3s. 8d. the Buſhel, ſo that the whole Mixture may ſtand in 4s. 4d. the Buſhel? Answ. $4\frac{4}{5}$ Buſhels.

—— V. ——

17. How much Braſs of 14d. and Pewter of $10\frac{1}{2}$d. the lb. muſt I melt with 50lb. of Copper worth 16d. the lb. ſo that the whole Mixture may ſtand in 1s. the lb.? Answ. 200lb. at $10\frac{1}{2}$d. and 50lb. at 14d.



Answ.
200 at $10\frac{1}{2}$d.
50 at 14d.

lb. Proof.

200 at $10\frac{1}{2}$d. is 2100
50 at 14d. is 700
50 at 16d. is 800

lb.
If 300 —— 3600 —— 1 comes 12d.

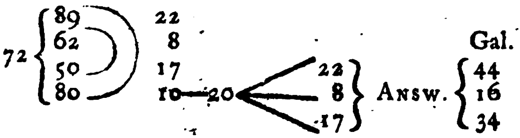
18. How much Gold of 21 and 23 Caracts fine muſt be mixed with 30oz. of 20 Caracts fine to bring it to 22 Caracts fine? Answ. 30 of 21, and 90 of 23.

19. With 60 Gallons of Brandy at 6s. the Gallon, I mixed Brandy of 5s. 4d. the Gallon, and ſome Water; then I found it ſtood me in 3s. 6d. the Gallon, I demand how much Brandy, and how much Water I took? Answ. 60 Gallons of Brandy at 5s. 4d. and $74\frac{2}{7}$ Gall. Water.

— VI. —

20. How much Malaga of 7s. 5d. the Gallon, and Sherry of 5s. 2d. the Gallon, and white Wine at 4s. 2d. the Gallon, muſt be mixed with 20 Gallons of Canary at 6s. 8d. the Gallon, ſo that one Gallon of the mixture may ſtand in 6s. the Gallon? ANSW. 44 Gall. at 7s. 5d. 16 Gall. at 5s. 2d. and 34 Gall. at 4s. 2d.

Example.



Proof.
44 at 89d. is 3916
16 at 62d. is 992
34 at 50d. is 1700
20 at 80d. is 1600

If ~~114~~————~~8208~~————1 comes 72

21. How much Alloy, and how much Gold of 21 and 23 Caracts fine, muſt be put to 30 oz. of 20 Caracts fine, to bring it to 18 Caracts fine? ANSW. 16$\frac{2}{3}$ oz. Alloy, 30 oz. of 21, and 30 oz. of 23 Caracts fine.

22. How do you prove the above Anſwer to be right? ANSW. Thus,

oz.
$16\frac{2}{3}$ Alloy Car.
30 of 21 is 630
30 of 23 is 690
30 of 20 is 600
——— ——— Car. fine
If $106\frac{2}{3}$ ——— 1920 — 1. comes 18.

23. How much Lead of $2\frac{1}{2}$d, the lb. Pewter of 10d. the lb. and Braſs of 16d. the lb. muſt I melt or mix with 112lb. of Copper of 18d. the lb. ſo that 1lb. of this Mixture may ſtand me in 12d.? Answ. 224 at $2\frac{1}{2}$d. the lb. 336 at 10d. and 532lb. at 16d. the lb.

—— VII. ——

24. How much fine Silver muſt be put to Bullion of $8\frac{1}{2}$oz. fine, to bring it to 10oz. fine? Answ. 9 oz.

R U L E.

As the Difference of the greater Fineneſs and the Maſs is to the Difference of the leſſer Fineneſs and greater, ſo is the Maſs or Quantity to the Quantity required.

$12 \left< \begin{matrix} 10 \\ 8\frac{1}{2} \end{matrix} \right| \begin{matrix} 1\frac{1}{2} \\ 2 \end{matrix}$ ——— $1\frac{1}{2}$ — 12 Answ. 9 oz.

Or thus,

Subtract the Fineneſs one from another, the Remainder multiply by the Maſs or Quantity, that Product divide by the Difference of the Maſs and the greater Fineneſs, and you have the Fineneſs required.

Greater Fineneſs 10
Leſſer ———— $8\frac{1}{2}$

$1\frac{1}{2}$
12

Difference between the Maſs and greater Fineneſs, $\Big\}\ \frac{18}{2}\ \Big\{\ 9$

Bullion 12
Fine 9

Proof.
fine $8\frac{1}{2}$
fine 9

If 21———————$17\frac{1}{2}$———12 comes 10 oz.

25. A Refiner has 28lb. of Silver Bullion of $8\frac{1}{2}$ oz. fine, how much fine Silver muſt he put to it to bring it to 10 oz. fine? Answ. 21lb.

26. A Goldſmith has Gold of $19\frac{1}{3}$ Caracts fine, how much fine Gold muſt he put to it to bring it to $23\frac{1}{2}$ Caracts fine? Answ. 200 Caracts.

—— VIII. ——

Caſe 3, Called *Alligation Total,* the particular Rates of all the Ingredients propoſed to be mixed, and the Sum of all their Quantities, with the main Rate of that Sum, being given, to find the particular Quantities of the Mixture.

27. A Tobacconiſt has two Sorts of Tobacco, *viz.* of 18d. and 9d. the lb. and has a Mind to mix 112lb. ſo that it may ſtand him in 16d. the lb. I demand how much he muſt take of each? Answ. $87\frac{1}{9}$lb. of 18d. and $24\frac{8}{9}$lb. of 9d.

R U L E.

As the Sum of all the Differences is to the Sum of all the Quantities given, ſo is every particular Difference to its particular Quantity.

Example.

$$16 \begin{cases} 18 \\ 9 \end{cases} \begin{array}{|l} 7 \\ 2 \end{array}$$

lb.

$$9 — 112 \begin{cases} 7 \text{ comes } 87\frac{1}{9} \\ 2 \text{ comes } 24\frac{8}{9} \end{cases}$$

112

Proof.

$87\frac{1}{9}$ at 18d. is 1568

$24\frac{8}{9}$ at 9d. is 224

lb.

If 112 ——— 1792 —— 1 Answ. 16d.

28. A Goldſmith has two Sorts of Silver Bullion, the one of 10 oz. fine, and the other of 5 oz. fine, and has a Mind to mix a lb. of it, ſo that it ſhall be 8 oz. fine: I demand how much of each he muſt take? Answ. $4\frac{4}{5}$ of 5 oz. fine, and $7\frac{1}{5}$ of 10 oz. fine.

29. A Grocer has Sugar of 12d. the lb. and of $6\frac{1}{2}$d. the lb. and has a Mind to mix 2 Hundred wt. of it, ſo that he may ſell it at 8d. the lb. I demand how much of each Sort he muſt take? Answ. $162\frac{10}{11}$lb. of $6\frac{1}{2}$d. and $16\frac{1}{11}$lb. at 12d.

30. A Refiner has Silver of $11\frac{1}{2}$ oz. fine, and of 7 oz. fine, and has a Mind to make up a Piece of Work requiring 35lb. of $9\frac{3}{4}$ oz. fine, how much muſt he take of each? Answ. $21\frac{7}{18}$lb. of $11\frac{1}{2}$ oz. fine, and $13\frac{11}{18}$lb. of 7 oz. fine.

31. Brandy of 3s. 6d. and 5s. 9d. the Gallon, is ſo to be mixed, that a Hhd. of 63 Gallons may be ſold for 12l. 12s. I demand how many Gallons muſt be taken of each? Answ. 14 Gallons of 5s. 9d. and 49 Gallons of 3s. 6d.

—— IX. ——

32. A Grocer has Sugar of 12, 10, and 5d. the lb. and mixed 112lb. of it, and then he found it ſtood him in 8d. the lb. I demand how many lb. he took of each Sort? Answ. 28lb. of 12d. 28lb. of 10d. and 56lb. of 5d.

Example.

8 { 12 . . . 3
   { 10 . . . 3
   { 5 . . . 4 and 2 are 6.

12—112 < 3, 3, 6

Proof.

		l.	s.	d.
3	28 lb. at 12d.	1 :	8 :	0
3	28 lb. at 10d.	1 :	3 :	4
6	56 lb. at 5d.	1 :	3 :	4
	112 at 8d. is £.	3 :	14 :	8

33. A Vintner has 3 Sorts of Wine, viz. of 24d. 22d. and 18d. the Gallon, now he has a Mind to mix a Caſk of 60 Gallons, ſo that he may ſell it at 20d. the Gallon, how much muſt he take of each? Answ. 12 at 24d. 12 at 22d. and 36 at 18d.

34. A Goldſmith has 3 Sorts of Silver, viz. of 11, 8, and 5 oz. fine, and has a mind to make a Piece of Work that ſhall weigh 10lb. of 9 oz. fine, how much of each muſt he take? Answ. $5\frac{5}{9}$lb. of 11 oz. fine, $2\frac{2}{9}$lb. of 8 oz. fine, and $2\frac{2}{9}$lb. of 5 oz. fine.

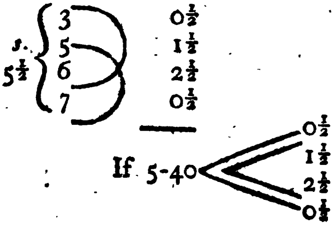
35. A Caſk of 58 Gallons is filled with Liquor of 7, 8, and 10d. the Gallon, and then it ſtands in $9\frac{1}{4}$d. the Gallon, I would know how many Gallons of each Sort was taken? Answ. $40\frac{6}{10}$ Gallons of 10d. $8\frac{7}{10}$ Gallons of 8d. and $8\frac{7}{10}$ of 7d.

—— X.

—— X. ——

36. A Merchant has Brandy of 3, 5, 6, and 7s. the Gallon, and has a Mind to fill a Caſk of 40 Gallons, ſo that he may ſell it at 5s. 6d. the Gallon, how many Gallons muſt he take of each? Answ.

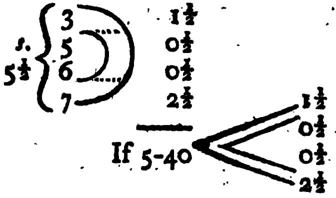
Example.



Proof.

Answ.	l.	s.	d.
4 at 3s.	0 :	12 :	0
12 at 5s.	3 :	00 :	0
20 at 6s.	6 :	00 :	0
4 at 7s.	1 :	08 :	0
40 at 5½s. is	11 :	0 :	0

Or this Way.



Proof.

Answ.	l.	s.	d.
12 at 3s.	1 :	16 :	0
4 at 5s.	1 :	00 :	0
4 at 6s.	1 :	04 :	0
20 at 7s.	7 :	00 :	0
40 at 5½s.	11 :	00 :	0

37. A Tobacconiſt has Tobacco of 5½d. 7¾d. 12½d. and 15¾d. the lb. makes up 4 Boxes of them of 22lb. each, ſo that it ſtands him in 9¼d. the lb. I want to know how many lb. he took of each Sort? Answ. $22\frac{22}{29}$lb. of 15¾d. $9\frac{3}{29}$lb. of 12½d. $19\frac{21}{29}$lb. of 7¾d. and $36\frac{12}{29}$lb. of 5½d. or otherwiſe.

38. A Merchant has certain Merchandizes, ſome of 9d. ſome of 12d. ſome of 24d. and ſome of 30d. the lb. how much of each Sort muſt he take to make up 99lb. ſo that they may ſtand him in 20d. the lb.? Answ. 24lb. of 30d. 33lb. of 24d. 30lb. of 12d. and 12lb. of 9d. or otherwiſe.

39. A Druggiſt has Drugs of 18, 15, 12, 9, 8, and 5d. the lb. how much muſt he take of each Sort to make up 318lb. ſo that they may ſtand him in 11d. the 11lb.? Answ. $82\frac{22}{23}$lb. of 18d. $41\frac{11}{23}$lb. of 15d. $27\frac{15}{23}$lb. of 12d. $13\frac{19}{23}$lb. of 9d. $55\frac{7}{23}$lb. of 8d. and $96\frac{18}{23}$lb. of 5d. or otherwiſe.

40. It is required to make up 100l. to conſiſt of one Hundred Pieces, viz. of Moidores of 30s. Guineas of 23s. and Piſtoles of 18s. 6d. *Quære*, how many of each muſt be taken to make up ſaid Sum of one Hundred Pounds? Answ. 6 at 30s. 18 at 23s. and 76 at 18½s.

CHAP. XXXIII.

SINGLE FALSE POSITION.

SECT. I.

THIS Rule is ſo called, becauſe by ſuppoſed Numbers taken at Adventure, and working therewith, according to the Nature of the Queſtion, as if it were the true Number, the true Number ſought is diſcovered.

1. Suppoſe the Ages of three Perſons make together 144 Years, and that the Age of the ſecond is double the Age of the firſt, and the Age of the third, is treble the Age of the ſecond, what is the Age of each Perſon? Answ. 16, 32, and 96 Years.

Rule.

Rule.

As the Reſult of your Poſition is to the Poſition, ſo is the given Number to the true Number ſought.

Suppoſe,

The 1ſt Man's Age 1
then the 2d muſt be 2
and the 3d muſt be 6

If 9—1—144 comes 16
If 9—2—144 —— 32
If 8—6—144 —— 96

Proof 144

2. Three Merchants made up a Stock of 500l. B. put in twice as much as A. and C. four Times as much as B. how much did each of them put in? Answ. A. $45\frac{5}{11}$l. B. $90\frac{10}{11}$l. and C. $363\frac{7}{11}$l.

3. There is a Ciſtern of Water which has 3 Cocks, when the greater, or firſt Cock is opened all the Water runs out in one Hour, when the ſecond Cock is opened, it runs out in two Hours, and when the third Cock is ſet open, it runs out in three Hours; in what Time will all the Water run out if all the Cocks are ſet open at once? Answ. In $32\frac{8}{11}$ Minutes.

4. What Number is it whoſe $\frac{1}{6}$, $\frac{1}{7}$, and $\frac{1}{3}$ Parts make 27? Answ. 42.

5. *Peter* drinks a Caſk of Beer out, qt. 16 Gallons in 6 Days, and *John* when he goes about it does it in 4 Days; now if they ſhould both drink together, in what Time would they make an end of it? Answ. In 2 Days $9\frac{3}{5}$ Hours.

6. Three Perſons, A. B. and C. diſcourſing concerning their Age, ſays B. to A. I am as old, and

half again as old as you, then ſays C. to B. I am twice as old as you, now ſays A. to them both, I am ſure the Sum of all our Ages is 154 Years, I demand each Man's Age? Answ. A. 28, B. 42, and C. 84.

7. A Gameſter loſes, in 4 Turns at Dice, 160 Shillings, and trebled each Turn the Sum he put in, I would know for how much he played the firſt and laſt Time? Answ. 4s. and 108s.

8. Forty Yards of Drugget, and 50 Yards of Cloth coſt 24l. 10s. but every Yard of Cloth coſt double as much as a Yard of Drugget, I demand what a Yard of Drugget coſt? Answ. 3s. 6d.

9. Suppoſe I lend at Intereſt a certain Sum of Money, at the Rate of 8 per Ct. ſimple Intereſt, and, that at the end of 10 Years, I received both for Principal and Intereſt 600l. I demand how much was the principal Sum I lent out at firſt? Answ. 333l. 6s. 8d.

—— II. ——

10. A Maſter Maſon, when he works alone, can finiſh a Piece of Work in 2½ Days, his Journeyman can do the ſame in 3¾ Days; and his Apprentice can do it in 4½ Days; now I demand in what Time they would finiſh the ſaid Work, if all three together go about it? Answ. In 1 Day, 3 Hours.

Suppoſe in one Day.

ds. ps. w. d.

If $2\frac{1}{2}$ —— 1 —— 1 comes $\frac{2}{5}$

$3\frac{3}{4}$ —— 1 —— 1 $\frac{4}{15}$

$4\frac{1}{2}$ —— 1 —— 1 $\frac{2}{9}$

$\frac{8}{9}$

ps. w. day ps. w.

If $\frac{8}{9}$ —— 1 —— 1 Answ. $1\frac{1}{8}$ Day.

11. There are 5 Mills, the firſt grinds 7 Buſhels of Corn in an Hour, the 2d 5, the 3d 4, the 4th 3, and the 5th 1; I demand in what Time the 5 Mills will grind 500 Buſhels, if they work all together? Answ. In 25 Hours.

12. There is a Ciſtern which can be filled by a Cock in 12 Hours, and has a Hole in the Bottom by which it can be emptied in 18 Hours, I demand in what Time the Ciſtern will be full, the Water running out of the Hole at the Bottom, at the ſame Time when the Water runs in from the Cock above? Answ. In 36 Hours.

13. There are 3 Mills, the firſt grinds in 2 Hours 3 Buſhels of Wheat, the 2d in 3 Hours 5 Buſhels, and the 3d in 5 Hours 7 Buſhels, I demand in how many Hours will they together grind 36 Buſhels? Answ. In $7\frac{121}{137}$ Hours.

CHAP. XXXIV.

DOUBLE FALSE POSITION.

SECT. I.

A Aſked B. how much his Horſe coſt him, B. anſwered, that if his Horſe coſt him 6 Times as much as he did, and 4l. more, he would ſtand him in 100l. I demand what the Horſe coſt? Answ. 16l.

To work this Rule, make Choice of any Number, and work with it according to the Nature of the Queſtion, as per Example: I ſuppoſe the Horſe coſt 20l. which I multiply by 6, comes 120l. and add 4, makes 124, which ought to be but 100, ergo, too much by 24, which I call the firſt Error, and mark it thus, (+) ſignifying more: *Again, I ſuppoſe the Horſe coſt 14l. which being worked as before, comes 12 too little, which is the ſecond Error, and mark it thus (—) ſignifying* leſs; *then add the Errors more and leſs together, comes 36 for a Diviſor, then multiply the Poſitions and their Errors croſs-wiſe, and their Product add, the Sum divide by 36 (the Diviſor) and the Quotient is the Anſwer required.*

NOTE. *When the Signs of* more *or* leſs *are alike, ſubtract; but when unlike, add.*

Example.

Suppoſe 20	Suppoſe 14	
6	6	+24
		—12
120	84	
add 4	4	36 Diviſor
124	88	
100	100	
24+	12—	16
20	14	6
		96
240	336	4
	240	
		100 Proof
	~~576~~	
	~~366~~ } 16 Answ.	
	~~3~~	

Or thus,

NOTE. Plus, *or* more, *ſubtract from the Middle Number*, Minus, *or* leſs, *add to the middle Number*; (=) *this ſignifies* equal.

1 *a*
6

If 6 *a*+4=100 what is 1 *a*
4

$\left.\begin{array}{r}96\\66\end{array}\right\}$ 16 Answ.

2. One being aſked how old he was, anſwered, if my Age was doubled, the Half, and the Quarter of my Age added to it, more one Year, I ſhould be 100 Years old; what is his Age? Answ. 36 Years.

3. I being aſked how long I had kept School, I anſwered, if you treble the Years, and add to it the Half and the Quarter of the Years, more ¾, it will be 34½ Years. I demand the Time? Answ. 9 Years.

4. If the Number of my Scholars was doubled, the ½, and the ¼ of the Number added to it, more 30, they would be 250, how many are they? Answ. 80.

5. One aſked how many Pence I had in my Pocket? I told him that my Pence, with ½, and ¼ with ⅛ together, leſs 2, would make 43d. well then, ſays he, you have 24d. Answ. Right.

6. If I made my Money 8 Times more than it is, and gave 6 Times 6 of it to the Poor, and divided the Reſt of it by 4, then I find that every Part is 21 Crowns, tell me how many Crowns I had? Answ. 15 Crowns.

7. A. aſked B. to lend him the 100 Crowns he had in his Pocket, B. anſwered, he had not ſo many, but, ſays he, If I had half as many more as I have, with ¼ and ⅛ and ⅙ of the Number of Crowns which I have, leſs 3, there would be 46, well, then, ſays A. I find you have only 24 Crowns? Answ. Juſt as many.

8. A Man on Horſeback ſets out from a certain Town, and a Coach ſets out from another Town, at a certain Diſtance they meet, the Coachman aſks the Man on Horſeback how many Miles he had rid, he anſwered, that, if he had rid 1½ Times as far again as he had done, he would have rid 36 Miles, well then, ſays the Coachman, I have rid ½ as far, and ¾ as far as you, now tell me how many Miles the Towns are aſunder? Answ. 25⅕ Miles.

—— II. ——

9. Divide 15 into two ſuch Parts, that when the greater is multiplied by 4, and the leſſer by 16, their Products muſt be equal? Answ. 12 and 3.

Example.

Suppoſe		Suppoſe		
9 and	6	10 and	5	
4	16	4	16	
36	96	40	80	
	36		40	
	60+		40+	
				60+
				40+
9	6	10	5	20
360	240	600	300	
		360	240	
		2~~40~~	6~~0~~	
		12	3	
		4	16	
	Proof	48	48	

Divisor: 2~~0~~

10. A Maſter hires a Journeyman, on this Condition, that he ſhall have 12d. a Day, and his Diet, for every Day he works, but for every Day he does not work, he is to pay his Maſter 6d. for his Diet; now, the 30th Day they come to an Account, but neither of them receives or pays any Money. I demand how many Days he worked, and how many Days he was idle? Answ. He worked 10 Days, and was idle 20.

11. What Numbers are they, that when you add them they make 266⅔, and when you multiply the one by 5, and the other by 3, their Products ſhall be equal? ANSW. 166⅔, and 100.

12. There are two Numbers, when they are added together, make 102, and the one multiplied by 15, is the ſame as the other, being multiplied by 21, what are thoſe Numbers? ANSW. 59½ and 42½.

13. Divide 21 into two ſuch Parts, ſo that when the greater is divided by the leſſer, and the leſſer by the greater, and afterwards the greater Quotient multiplied by 5, and the leſſer by 125, their Products ſhall be equal? ANSW. 17½, and 3½.

III.

14. A Maſter hires a Servant for 40 Days, when he works he is to have 15d. a Day, and when he is idle he is to pay his Maſter 4d. a Day; at the End of 40 Days they come to an Account, and the Servant receives 23 Shillings and a Penny: tell me how many Days he wrought, and how many he was idle? ANSW. He wrought 23 Days, and was 17 Days idle.

Examples

Example.

```
        Suppoſe                  Suppoſe
wk'd, 25 at 15d. 375 | 24 at 15d. 360
idle, 15 at  4d.  60 | 16 at  4d.  64
      --         ---   --         ---
      40         315   40         296
     Should be   477              277
 s.  d.          ---              ---
 23 : 1          +38              +19            38+
 12                      X                       19+
---                                              ---
277d.                                             19
                  25              24
                  ------------------
                 475              912
                                  475
                                  ---
                              437 {              s.  d.
                              199 { 23 at 15d.  28 : 9
                                2 { 17 at  4d.   5 : 8
                                   ---------   ------
                            Proof  40           23 : 1
```

15. A Merchant has 100 Barrels of Wheat and Barley, which coſt him 46l. 10s. the Wheat ſtands him at 12s. and the Barley at 6s. the Barrel, tell me how many Barrels he has of each? ANSW. 55 of Wheat, and 45 of Barley.

16. There are two Numbers, when you add them they make 100, and when you multiply the greater by 3, and the leſſer by $4\frac{7}{8}$, their Difference is $4\frac{11}{16}$, what are thoſe Numbers? ANSW. $62\frac{1}{2}$, and $37\frac{1}{2}$.

17. A Goldſmith has two Maſſes of Silver, wt. together 24lb. the heavieſt at 5s. and the lighteſt at 5s. 4d. the oz. amounting together to 74l. 4s. Tell me how much each Maſs weighed? ANSW. 13lb. and 11lb.

18. There are two Numbers which when added make 35, if you divide the leſſer by 4 and the greater by 3, their Quotients being added will make 11. I demand the Numbers? Answ. 27 and 8.

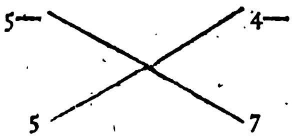
19. A. departs from Dublin, at the ſame Time that B. departs from Cork, A. is bound for Cork, and B. for Dublin, each keeping the ſame Road, and the Diſtance between Dublin and Cork, ſuppoſe 100 Miles; when they meet, the Miles A. had travelled being multiplied by 3¾, and the Miles B. had travelled being multiplied by 5¼, the Difference of their Product will be 75¾. I demand how much farther the one went than the other? Answ. A. went farther by 33⅓ Miles.

— IV. —

20. A. and B. go out of a Town, keeping both the ſame Road, but A goes every Day 8 Miles, and B. goes the firſt Day one Mile, and the ſecond Day 2 Miles, and ſo on, every Day one Mile more. I demand when B. will overtake A.? Answ. In 15 Days.

Example.

Suppoſe A. 5	B. 1	Suppoſe 7	B. 1
8	2	8	2
—	3	—	3
40	4	56	4
15	5	28	5
—	—	—	6
25	15	28	7
5—		4—	—
			28



5—
4—
——
1

20 35
20
——
25
11 } 15 Days.

21. There are two Maſter Maſons, who are each to build a Wall of equal Dimenſions, A. employs ſo many Men as finiſh in a Day 22½ Perches, B. employs, the firſt Day, as many Men as finiſh 6 Perches, the ſecond Day, as many as finiſh 9 Perches, and ſo on, every Day 3 Perches more; in what time will they have built an equal Number of Perches? Answ. In 12 Days.

22. A Gentleman hires 2 Labourers, to the one he gives conſtantly 9d. a Day, to the other he gives the firſt Day 2d. the ſecond Day 4d. the third Day 6d. and ſo on, every Day 2d. more. I demand in how many Days they will have earned equal Money? Answ. In 8 Days.

23. A. and B. buy an equal Quantity of Cloth, and lay out an equal Quantity of Money, A. gives 7s. for every Yard he buys, and B. gives 2s. for

the firſt Yard, and 4s. for the ſecond Yard, and ſo on, 2s. more for each Yard. I want to know how many Yards they bought, and how much Money they laid out? ANSW. 6 Yards, and laid out 42s. each.

— V. —

24. What Numbers are they, that when added make 25, and when you half the one, and double the other, their Sums ſhall be equal? ANSW. 20 and 5.

Example.

Suppoſe	Suppoſe	
14 and 11	18 and 7	
double 11	double 7	
½ is 7	½ is 9	
22	14	15+
7	9	5+
15+	5+	10
14	18	
70	270	
	70	
	200 } 20	
	10	

Conſequently the other 5

25. One received two Heaps of Crowns making both together 36, the ½ and ¼ of the firſt Heap, were equal to the ¼ and ⅛ of the ſecond Heap, I demand how many Crowns there were in each Heap? ANSW. 12 and 24.

26. There are two Numbers, when you add them together they make 30, the $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{6}$, of the greater is equal to $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{2}{3}$ of the leſſer Number, tell me what are the Numbers? ANSW. 12 and 18.

—— VI. ——

27. A. and B. diſcourſing of their Money, ſays A. to B. if you give me 3s. of your Money, I ſhall have 5 Times as many Shillings as you have left; no, ſays B. it is better that you give me 5s. of yours, for then our Money will be equal: how many Shillings had each? ANSW. A. 17 and B. 7.

Example.

Suppoſe A. 22 B. 8 — Suppoſe A. 12 B. 6

3 3 — 3 3

25 5 — 15 3

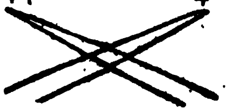
22 8 — 12 6

5 5 — 5 5

17 13 — 7 11 — 4+

13 — 11 — 4−

4+ — 4− — 8



22 8 — 12 6

88 32 — 48 24

136 56

8) 17 & 7

28. Says A. to B. give me 1s. of your Shillings, and I ſhall have double the Shillings that you have left; B. anſwered, it is more reaſonable that our Sums ſhould be equal, and therefore, if you give me 1s. I ſhall have as many as you. I demand how many Shillings each had? ANSW. A. 7 and B. 5.

29. If from a Piece of Cloth I cut $\frac{2}{3}+11$ Yards, there is left $\frac{1}{2}-17$ Yards, I demand how many Yards were in the whole Piece? ANSW. 36 Yards.

VII.

30. What Number is it, whoſe $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{3}{8}$ being multiplied together make 24? ANSW. 8.

Example.

Suppoſe		Suppoſe	
12	12	4	4
12	—	—	4
—	$\frac{1}{2}$ is 6	$\frac{1}{2}$ is 2	—
144	$\frac{1}{4}$ is 3	$\frac{1}{4}$ is 1	16
12	—	—	4
—	18	2	—
1728	$\frac{3}{8}$ is $4\frac{1}{2}$	$\frac{3}{8}$ is $1\frac{1}{2}$	64
	81	3	
Ought to be	24	24	
	57+	21−	21−
	1728	64	57+
			78
	36288	3648	
	3648		
	39936		

39936
7888
77 $\Big\}\ \sqrt[3]{512}=8$

Or thus,

Suppoſe

1 *a*

$\frac{1}{2}$ ————— $\frac{1}{4}$ ————— $\frac{3}{8}$

If 1 $a_{\frac{3}{64}}$ ===24 what is 1 *a*

$$\begin{array}{r} 24 \\ 64 \\ \hline \end{array}$$

$$\begin{array}{r} \cancel{1}\cancel{5}\cancel{3}6 \\ \cancel{3}\cancel{3}\cancel{3} \end{array}\Big\{ \begin{array}{l} 3 \\ \sqrt{}\ 512 = 8 \end{array}$$

31. A. aſked B. how old he was, B. anſwered, if $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{3}{8}$ of my Years are multiplied, their Product will be 192, tell me B's. Age? Answ. 16 Years.

32. What Number is it whoſe $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, and $\frac{1}{6}$ being multiplied together produce 6998 $\frac{2}{5}$? Answ. 36.

C H A P. XXXV.

Queſtions to exerciſe moſt of the Rules *hitherto dedelivered, promiſcuouſly ſet down.*

THERE is a Maſt or Pole $\frac{1}{9}$ of its Length ſtands in the Ground, 12 Feet of it in the Water and $\frac{5}{6}$ of its Length in the Air, or above Water, I demand the whole Length? Answ. 216 Feet.

2. If from a Piece of Cloth I cut $\frac{9}{16}$—12 Yards, then there is left $\frac{3}{8}$+20 Yards, I demand how many Yards there were in the Piece? Answ. 128 Yards.

3. Three Merchants, A. B. C. have gained in Partnerſhip 234l. which they are to divide in this Manner, when the Profit of A. is multiplied by 2, and that of B. by 3, and C's. by 4, their Products are to be equal, I demand how much each of them is to receive? Answ. A. 108l. B. 72l. and C. 54l.

4. When 198lb. of London are carried 8 Miles for 25s. 7$\frac{1}{5}$d. how much muſt one give to carry 480lb. of Amſterdam 15 Miles, if 110lb. at London are equal to 100 at Amſterdam? Answ. 6l. 8s.

5. There is a Wall of 2000 Feet long, and 2$\frac{1}{2}$ Feet thick, the Stones are $\frac{1}{2}$ Foot long, $\frac{1}{4}$ Foot broad, and $\frac{1}{8}$ Foot thick, including the Mortar, and in the whole Wall are 4000000 Stones, I demand the Height of the Wall? Answ. 7$\frac{1}{2}$ Feet.

6. What Numbers are they whoſe $\frac{1}{2}$, $\frac{1}{8}$, and $\frac{1}{12}$ of the one are equal to $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{9}$ of the other? Answ. 264 and 306.

7. There are 2 Pieces of Linen, the one is 9 Yards ſhorter than the other, and coſt 3l. 1$\frac{1}{5}$s. the other Piece at the ſame Price coſt 3l. 12s. I demand how many Yards there are in both Pieces, and the Price of one Yard? Answ. 111 Yards, at 1$\frac{1}{5}$s. the Yard.

8. If with 100 Barrels of Beer I mix 66$\frac{2}{3}$ Barrels of Water, it is 3 Shilling Beer, I demand what Beer it was before? Answ. 5 Shilling Beer.

9. Tell me a number whoſe half being divided by 6, its $\frac{1}{3}$ by 4, and its $\frac{1}{4}$ by 3, each Quotient ſhall be 9? Answ. 108.

10. A Piece of Satin coſt a certain Sum, and being ſold for 3l. 10s. there is loſt $\frac{2}{5}$ in a Shilling, I demand the firſt coſt? Answ. 5l. 16s. 8d.

11. A. has Brandy which coſt him 4s. the Gallon, in Barter puts it at 4s. 6d. and gives 6 Months Time, B. has Wine which ſtands him in 10l. 5s. the Hhd. and puts it at 11l. I demand how much Time B. muſt give to make the Barter equal? Answ. $3\frac{21}{41}$ Months.

12. A. ſets out from Cork to Clonmell, at the ſame Time B. ſets out from Clonmell towards Cork, the Diſtance between both Places ſuppoſe 30 Miles, and both Perſons keep the ſame Road, A. goes every Day 2 Miles more than B. and the ſecond Day they meet. I demand how many Miles a Day each of them has travelled? Answ. A. $8\frac{1}{2}$, and B. $6\frac{1}{2}$.

13. When a Buſhel of Wheat coſt 3s. 4d. the Penny Loaf weighs 12 Ounces, what ſhall a Loaf worth 9d. weigh when the Wheat is at 10s. 8d.? Answ. $33\frac{3}{4}$ Ounces.

14. If 12 Boarders drink in 7 Days half a Barrel of Beer, how long would the ſame laſt if 2 Boarders more came among them? Answ. 6 Days.

15. If a Hhd. of Wine be ſold for 10l. there is loſt 6 per Ct. how much is the Gain or Loſs per Ct. when 5 Hhds. are ſold for 45l. 10s.? Answ. $14\frac{23}{50}$ per Ct. Loſs.

16. Eight Perſons, conſiſting of Men and Women, have ſpent together 5s. 4d. each Man 10d. and each Woman 6d. I demand how many Men and Women there were? Answ. 4 Men and 4 Women.

17. What is the Product of 19l. 19s. $11\frac{3}{4}$d. being multiplied by 19l. 19s. $11\frac{3}{4}$d.? Answ. 399l. 19s. $2\frac{1}{1572}$d.

18. I have a Bond, ⅓ whereof is preſent Payment, ¼, in 4, ⅕ in 5, and the Remainder in 6 Months, in what Time might I receive the ſame without any Prejudice to myſelf? ANSW. In 3 Months and 9 Days.

19. How many Yards of Bays of $1\frac{1}{16}$ Yards wide, will be wanted to hang a Room of 16½ Feet long, 12¼ Feet broad, and 10¾ Feet high? ANSW. $62\frac{12}{27}$ Yards.

20. A Fiſherman being aſked how much Fiſh he had caught, anſwered, that the ⅜ of his Fiſh were Herrings, ⅙ Whitings, ⅖ Haddocks, and 21 Cods, now tell me how many he had in all, and how many of each Sort? ANSW. 135 Herrings, 144 Haddocks, 60 Whitings, and 21 Cods, in all 360.

21. A Gentleman has at Work 3 Maſter Maſons, who have each 8 Journeymen, and earn in 5 Weeks (each Week counted 6 Days) 43l. 4s. now the ſame Gentleman employs in another Work 5 Maſter Maſons, who have each 10 Journeymen, who earn every Week (each Week 5½ Days) as much as the former. I demand how much they would earn in 8 Weeks? ANSW. 132l.

22. Two Merchants enter into Partnerſhip, and each of them puts in 12 Pieces of Cloth, but thoſe of A. coſt 48l, more than thoſe of B. the Cloth being ſold they find to have gained 273⅗l. of which B. has for his ſhare 122⅖l. to know at how much each Piece was valued? ANSW. A's. at 21l. and B's. at 17l.

23. I once counted my Pence, and found that when I multiplied the ½, ¼, and ⅓ of the Number, the Product was 72000d. tell me how many Shillings I had? ANSW. 10s.

24. If 7 Perſons drink 36 Gallons of Beer in 12 Days, how many Gallons will be drank out at that Rate in 8 Days by 14 Perſons? Answ. 48 Gall.

25. One being aſked the Hour of the Day anſwered, that the Time paſt from Noon was equal to $\frac{2}{13}$ of the time remaining from Midnight. I demand what o'Clock it was? Answ. 36 Minutes paſt 1.

26. Three Merchants are in Company, their Stock is 400l. The Money of A. continued in 5 Months, that of B. 6 Months, and C's. 9 Months, and they gain 375l. which they divide equally. I demand the Stock each of them put in? Answ. A. 167$\frac{19}{43}$, B. 139$\frac{23}{43}$, and C. 93$\frac{1}{43}$l.

27. There is a certain Number, which if you divide by 7, its Quotient multiplied by 3, that Product divided by 5, from the Quotient ſubtract 20, to the reſt add 30, and half the laſt Sum ſhall make 35. I demand the Number? Answ. 700.

28. A. aſked B. his Age, B. anſwered thus, if you ſquare my Age and divide the Product by 2, the Quotient you'll find to be 55$\frac{1}{8}$, well ſays A. then you are exactly 10$\frac{1}{2}$ Years.

29. If 16 Men in 20 Days build a Wall of 25 Feet long, 6 Feet high, and 2 Feet thick: In how many Days will 80 Men build a wall of 400 Feet long, 10 Feet high, and 3 Feet thick? Answ. In 160 Days.

30. A Ship being mann'd with 300 Men, and provided with Bread for 12 Months, ſo that each Man has 20 Ounces a Day, but having been 6 Months on their Voyage, they find it will require 9 Months more before they finiſh their Voyage, and alſo that they have loſt 50 of their Men; now tell

me how many Ounces of Bread each Man may have during the ſaid nine Months, each Month 30 Days? Answ. 16 Ounces.

31. A. Merchant ſold Tobacco at 15d. the lb. and loſt at the Rate of 10 per Cent. he ſold 100l. worth more of the ſame Parcel, and gained 40 per Cent. tell me now how many lb. there were in the Parcel, and what Rate he ſold it the lb.? Answ. $1028\frac{4}{7}$lb. at $23\frac{1}{3}$d. the lb.

32. Four Perſons hire a Coach to go 100 Miles, for 9l. 10s. with Condition that if they take any Body in upon the Road, the Profit ſhall belong unto them, now when they have been gone 40 Miles, they take into the Coach two Perſons with Condition, that they ſhall pay proportionably with the other 4 Perſons. I demand how much each of them ought to pay? Answ. the 4 Perſons, 7l. 6s. $1\frac{11}{13}$d. and the 2 Perſons, 2l. 3s. $10\frac{2}{13}$d.

33. A Vintner has a Caſk of Wine, qt. 500 Gallons, of which he draws 50 Gallons, and then fills it up with Water, and does ſo 5 Times. I demand how much Wine, and how much Water there is left in the Caſk? Answ. $295\frac{49}{200}$ Gallons of Wine, and $204\frac{151}{200}$ Gallons of Water.

34. If a Mother and 2 Daughters, together, can ſpin 3lb. of Flax in 1 Day, and that the Mother alone can do it in $2\frac{1}{2}$ Days and the eldeſt Daughter in $2\frac{1}{4}$ Days, in what Time could the youngeſt Daughter do it alone? Answ. in $6\frac{3}{7}$ Days.

35. A Merchant loads 2 veſſels, in A. 150 Hhds. and in B. 240 Hhds. of Wine, the Ships coming by a certain Paſs, A. pays for Toll 1 Hhd. and receives 12s. back, B. pays alſo 1 Hhd. and 36s. more. I demand at how much each Hhd. was valued? Answ. 4l. 12s.

36. A Gentleman beſtows 1000l. in Legacies in this Manner, to A. a certain Sum, to B. ¼ more than to A. to C. ¼ leſs than to A. and to D. twice as much as to C. I demand how much each of them muſt have? Answ. A. $222\frac{2}{9}$l. B. $277\frac{7}{9}$l. C. $166\frac{6}{9}$l. and D. $333\frac{3}{9}$l.

37. When I ſell a Yard of Cloth for 15d. I gain 10s. by the Piece, and when I ſell the Yard for 14d. I gain 6s. by the ſame Piece. I demand how many Yards were in the Piece? Answ. 48 Yards.

38. Four Merchants have a certain Sum of Money to divide between them in this Manner, when A. has ¼ of the whole Sum, then B. gets ⅕, and when C. gets ½, then D. muſt have ⅜, now if D. gets 150l. for his Share, I demand how much the others muſt have? Answ. A. 100, B. 80, and C. 200l.

39. Bought 40 Yards of Cloth, of 2¼ Yards broad; but being made wet, did ſhrink in Length upon every 4 Yards half a Quarter, and in Breadth upon 1½ Yard, one Nail and half; to line this Cloth I bought Bays of 5 Quarters broad, which being made wet, did ſhrink upon 20 Yards in Length the whole Breadth, and in Breadth it did ſhrink half a Nail. I demand how many Yards of Bays would line the ſaid Cloth? Answ. $71\frac{7}{13}$ Yards.

40. In what Time could I with 514l. gain 66l. 16s. 4⅘d. at the Rate of 8 per Cent. per Annum? Answ. in 19½ Months.

41. If 4lb. of A. weigh as much as 3lb. of B. and 5lb. of B. as much as 4lb. of C. and 6lb. of C. as much as 5lb. of D. how many lb. of D are then as heavy as 240lb. of A.? Answ. 120lb. of D.

42. There is a certain Number of Horſe and Foot to be ferry'd over a river, and they agree to pay for 2 Horſes 2½d. and for 7 Foot 3½d. now when they were all over, the Ferryman received 25l. 7 Foot always followed 2 Horſe. I demand how many Horſe and Foot there were? Answ. 2000 Horſe and 7000 Foot.

43. Three Merchants put in together 100l. B. put in 3 Times as much as A. more 4l. and C. put in as much as A. and B. together, more 6l. I demand how much each of them put in? Answ. A. 10¾l. B. 36¼l. and C. 53l.

44. How many Pears can I have for 11 Shillings and 3d. if 70 Almonds are worth 50 Cheſnuts, and 48 Cheſnuts 1 Pomegranate, and 28 Lemons 18 Pomegranates, and 25 Pears 10 Lemons, and 108 Almonds coſt 2¾d.? Answ. 375 Pears.

45. Three Fiſhermen have each of them caught a certain number of Fiſh, when the firſt and ſecond Man's Fiſh are put together they make 110, when the ſecond and third are put together, they make 130, and when the firſt and third are put by one another, then there are 120, now the Fiſh is to be divided equally amongſt them, I demand each Man's Share, and how many each of them had caught? Answ. 50, 60, and 70, and each Man had 60 for his Share.

46. If 6 Gallons of Brandy, and 4 Cobs, (each 4s. 9d.) ſtand in Proportion againſt 15 Gallons leſs 5 Cobs, what is the Price of 1 Gallon? Answ. 1 Cob.

47. There are 12 Troopers, 25 Soldiers, and 18 Seamen who have got a Booty of 897l. now, according to Agreement, one Trooper muſt have

as much as two Soldiers, and 3 Soldiers as much as 5 Seamen, I demand each Man's Share? ANSW. a Trooper 30l. a Soldier 15l. a Seaman 9l.

48. There is a Golden Cup, valued at 70 Crowns, and two Heaps of Crowns, now when you put the Cup by one of the Heaps, they are together 4 Times the Value of the firſt Heap, but when you put the Cup by the ſecond Heap, they are together double the Value of the firſt Heap, I demand how many Crowns there were in each Heap? ANSW. 50 and 30.

49. Three Merchants made a Company, A. put in 150l. for 14 Months, B. put in a certain Sum for a Year, and C. put in 100l. for a certain Time; ſome Time afterwards they find that their Stock and Profit together made 475l. of which A. took 195l. B. 153l. and C. 127l. I demand how much B. put in, and how long Time C.'s Stock was in? ANSW. B. put in 121$\frac{31}{44}$l. and C.'s Stock was in Company for 12$\frac{3}{5}$ Months.

50. A Fountain has 4 Cocks, A, B, C, D, and under the Fountain ſtands a Ciſtern which can be filled by the Cock A, in 6 Hours, by B, in 8, by C, in 10, and by D, in 12 Hours; now the Ciſtern has 4 Holes, as E, F, G, H, and can be emptied by the Hole E, in 6 Hours, by F, in 5, by G, in 4, and by H, in 3 Hours: Suppoſe then the Ciſtern to be full of Water, and that all the Cocks and Holes were let run together, I demand in what Time the Ciſtern would be empty? ANSW. in 2$\frac{2}{19}$ Hours.

INSTRUCTIONS
FOR
BOOK-KEEPING.

QUESTION I.

HOW many Ways of dealing on Merchandize are there?

A. Three: *viz.* Firſt, on one's own Account.
Second, on Commiſſion.
Third, in Company.

Q. What doth Merchants Buſineſs conſiſt in?

A. Firſt, in buying and ſelling.
Second, in paying and receiving.
Third, in drawing and remitting.
Fourth, in ſending Goods abroad, and receiving Goods from abroad.
Fifth, in inſuring and getting Goods inſured.
Sixth, in giving and receiving Intereſt, Mortgage and Bottomry.

Q. What is the firſt Thing to be done in order to keep your Books after the *Italian* Manner?

A. I muſt take the Inventory, or State of all that I have in the World, that is, Money, Effects, Debts, &c. which I muſt add up to know the total Sum: Next, I muſt ſet down what I am indebted to others, and if I take this laſt Sum from the firſt, the Remainder is what I am worth.

Q. How will you ſtate in your Journal the Amount of the Inventory of your Effects?

A. I muſt make every Thing in particular, which I have Debtor to Stock, that is to myſelf, as per Example.

Sundry Accounts Debt. to Stock, *viz.*	£. 7393 : 19 : 6
Caſh, for ſo much I have in divers Species,	1345 : 10 : 0
Houſe in *Broad-ſtreet*, for ſo much it coſt me, — —	859 : 10 : 0
Ship the *Neptune*, for ſo much ſhe ſtands me in, — —	765 : 00 : 0
Lands in *Imakilly* worth —	2400 : 00 : 0
Peter Lepper, of *London*, (*H A) for Balance of Account —	367 : 04 : 0
Voyage to *Hamburgh*, for 400 Caſks of Butter in the Hands of *John Rougier*,	600 : 10 : 0
Tobacco, for 12 Hhds. nett 6842*lb.* at 9*d.* per *lb.* is —	256 : 11 : 6
Wool, for 9 Bags, 207 Stone, at 11*s.* 6*d.* per Stone, —	119 : 00 : 6
Beef, for 500 Barrels, at 20*s.* per Barrel.	500 : 00 : 0
Hides, for 300 ps. 200*Ct.* 3*qrs.* 0*lb.* at 18*s.* per *Ct.* —	180 : 13 : 6
	£. 7393 : 19 : 6

Q. How would you ſtate the ſecond Part of your Inventory, that is, what you are indebted to others?

A. I muſt make Stock, that is myſelf, Debtor to ſundry Accounts, *i. e.* to every one in particular that I am indebted to, as per Example.

Stock Debtor to ſundry Accounts, for ſo much I find myſelf indebted to the following Perſons, *viz.*	£. 1592 : 15 : 1
To *Arnold Jacob*, his Account of Intereſt,	500 : 00 : 0
To ditto his Account, current for half Year's Intereſt, —	20 : 00 : 0

To

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* For H A read, his Account; and for M A my Account.

To *J. Harrinbock* for Balance of Accounts	104 : 00 : 0
To *Abraham Deveer* of *Rotterdam* (M A) 1000 Gilders, which I value at 2*s.* each, is — —	100 : 00 : 0
To *Jonathan Richardſon*, of *Liſbon*, (M A) 1100 ℔ and 400 Res, which I value at 6*s.* per Milre, —	330 : 02 : 4
To *Anthony Dewit*, of *Briſtol*, (M A)	116 : 00 : 0
To *Abraham Saunders*, of *Limerick*, —	150 : 00 : 0
To *Samuel de la Fontaine*, of *Rochelle*, (M A) 3849 Livres, which I value at 17*d.* make — —	272 : 12 : 9
	£. 1592 : 15 : 1

Of BUYING and SELLING.

Q. When you buy Goods for ready Money?

A. Such Goods, naming them, muſt be made Debtor to Caſh.

Q. When you buy Goods upon Time?

A. The Goods muſt be Debtor to the Perſon you bought them from.

Q. When you buy half for ready Money, and half payable upon Time?

A. The Goods Debtor to the Perſon I bought them from for the whole Sum, and afterwards I make the Perſon from whom I bought the Goods, Debtor to Caſh for the Money I paid him: or thus, I make the Goods Debtor to ſundry Accounts, *viz.* To Caſh for one half, and to the Perſon I bought them from for the other half.

Q. When you ſell Goods for ready Money?

A. Caſh muſt be Debtor to the Goods ſold.

Q. When you ſell Goods upon Time?

A. The Buyer Debtor to the Goods ſold.

Q. When you ſell Goods for one half ready Money, and the other half upon Time.

A. The Buyer Debtor to the Goods for the whole Coſt, and Caſh Debtor to the Perſon that bought them for the Money received; or thus, ſundry Accounts

Debtor to the Goods ſold, *viz.* Caſh for the Money received, and the Perſon who bought them for the Remainder.

Of receiving GOODS *from abroad, and ſending* GOODS *abroad.*

Q. When you ſell Goods which belong to another Perſon abroad?

A. I make the Perſon or Perſons, to whom I ſell, Debtor to Goods belonging to ſuch a one.

Q. When you have ſold all the Goods which did belong to your Friend, what muſt be done then?

A. Firſt, I muſt ſee what Charges I have laid out on them; I muſt alſo caſt up my Commiſſion at 2½ per Cent. or according to the Country where I am, both which Sums I muſt ſubtract from the Produce of the Goods, and the Remainder I call the nett Proceeds, which belong to the Perſon whoſe Goods they are, then I muſt write in my Journal as follow:

Goods belonging to ſuch a Perſon, Debtor to ſundry Accounts, *viz.*

To Charges for Duty, Freight, Cellarage, &c. — — — £.
To Profit and Loſs for my Commiſſion, £.
To the Owner for the nett Proceeds due to him. — — — £.

Q. When you ſend Goods abroad for your own Account, ſuppoſe to *Rotterdam*?

A. I muſt make Voyage to *Rotterdam* Debtor to ſundry Accounts, *viz.*

To the Goods I ſhip off for the Coſt of them — — £.
To Charges for Duty, &c. — £.

Q. When your Correſpondent ſends you an Account of Sales for the Goods you ſent him?

A. I muſt make the Perſon that ſold them M. A. Debtor to Voyage to *Rotterdam*, for the nett Proceeds according to his Account of Sale, which Proceeds, if they be in the Money of the Country where he lives, I muſt reduce (according to the current Exchange) to the Value of the Money of the Country where I am.

Q. When your Correſpondent has, by your Order, and for your Account, bought and ſhipped Goods?

A. I muſt make Voyage from ſuch a Place Debtor to him that bought and ſhipped them, M. A. for the whole Coſt and Charges, according to his Account, which if it be in foreign Money, I muſt reduce to the Money of the Country where I am, according to the current Courſe of Exchange.

Q. When you ſhip off Goods for another Man's Account?

A. He for whoſe Account I ſhip them, H. A. muſt be Debtor to ſundry Accounts, *viz.*

To Goods for the Coſt thereof, £.
To Charges for the Duty, &c. £.
To Profit and Loſs for my Commiſſion, £.

Q. When any Body ſends you Goods from abroad half for his, and half for your Account?

A. Voyage from ſuch a Place, in Company with ſuch a one, Debtor to him that ſent the Goods M. A. for half the Amount, the which, if it be in foreign Money, muſt be reduced (at the current Exchange) into the Money of the Country where I am.

Q. When you ſell any of the aforeſaid Goods on Truſt?

A. He that buys them is Debtor to Voyage from ſuch a Place, in Company with ſuch a one.

Q. When all the Goods in Company aforeſaid are ſold?

A. Voyage from ſuch a Place, in Company with ſuch a one, Debtor to ſundry Accounts, *viz.*
To Charges for Duty, Cellarage, &c. £.
To Profit and Loſs for my Commiſſion, £.
To my Partner, H. A. for half the nett Proceeds, —— £.
To Voyage from ſuch a Place, in Company with ſuch a one, for my half nett Proceeds, — £.

£.

Q. When you ſhip Goods, half on your own Account, and half on another Man's Account?

A. Sundry Accounts Debtor to ſundry Accounts, *viz.*
He that is half concerned in the Cargo, for his half — £.
Voyage to ſuch a Place for my half £.

To the Goods for the Coſt thereof, £.
To Charges for Duty, &c. £.
To Profit and Loſs for my Commiſſion, £.

£.

Of DRAWING and REMITTING.

Q. What do the Words Drawing and Remitting ſignify?

A. Drawing is to write a Bill of Exchange, wherein I order a Perſon to pay a certain Sum to another Perſon. Remitting, is when I buy a Bill of Exchange, and ſend it to another Perſon to receive the Contents thereof.

Q. When you draw on any Body for your Account?

A. If I receive the Value, that is, Money, for the Bill, then I muſt make Caſh Debtor to him on whom or for whoſe Account I draw M. A. but if I do not receive the Money, then the Perſon to whom I gave the Bill is Debtor to him, for whoſe Account I draw M. A.

Q. When you draw on any Body for H. A. and receive Value?

A. Caſh Debtor to him on whom I draw H. A.

Q. When you draw on any Body for H. A. and remit the Bill to another to be negociated for your Account?

A. I muſt make Account of Exchange Debtor to the Perſon drawn on for the Sum.

Q. When you draw on any Body for your Account, and ſend or remit the Bill to another Perſon for your Account?

A. He to whom I remit the Bill, M. A. Debtor to him on whom I draw the ſame M. A.

Q. When you draw on any Body for your Account, and remit the Bill to another for his Account?

A. He to whom I remit the Bill, H. A. Debtor to the Perſon on whom I draw the ſame M. A.

Q. When any body draws on you for your Account, and that you pay the Money?

A: He that draws on me, or orders to be drawn on me, M. A. Debtor to Caſh.

Q. When any Body draws on you for his Account, and that you pay the Money?

A: He that draws on me, or orders to be drawn on me, H. A. Debtor to Caſh.

Q. When your Correſpondent draws on another for your Account?

A. The Drawer M. A. Debtor to him on whom he draws M. A.

Q. When you draw on any Body for your Account, and that the Bill is proteſted for Non-payment, and that another accepts and pays the Bill for your Honour, and for your Account?

A. He on whom I have drawn the Bill, M. A. Debtor to him that accepts and pays the ſame, M. A.

Q. When you draw on any Body for Account of another Perſon, and that you receive the Value?

A. Caſh Debtor to him for whoſe Account I draw H. A.

Q. When any Body draws on you for Account of another Perſon, and that you pay the Value?

A. He for whoſe Account the Bill is drawn, H. A. Debtor to Caſh.

Q. When you have drawn on any Body for your Account, and that the Bill comes back with Proteſt for want of Acceptance or Payment, and that you reimburſe or pay the money with the Re-exchange, and other Charges of Proteſting, *&c.*

A. Sundry Accounts Debtor to Caſh, viz.

He on whom I had drawn the Bill for the principal Sum . . } £.
Profit and Loſs for Re-exchange and other Charges, } £.

Q. When you have drawn on any Body, H. A. or for Account of another, and that he lets the Bill be Proteſted, and that another Perſon accepts the ſame, and pays it for your Honour?

A. He on whom or for whoſe Account the Bill was drawn, H. A. Debtor to him that accepts or pays the Bill, M. A.

Q. Suppoſe the Bill comes back with Proteſt, and that you reimburſe the Money?

A. He for whoſe Account the bill was drawn, H. A. Debtor to Caſh, for the principal and all other Charges.

Q. When any Body draws on another Perſon for your Account, and that the Bill comes back Proteſted for want of Acceptance and Payment?

A. He on whom the Bill was drawn, M. A. Debtor to him that drew the Bill, M. A.

Q. When you take a Bill of Exchange to diſpoſe of again?

A. Account of Exchange Debtor to Caſh.

Q. But ſuppoſe you remit the Bill of Exchange to another Perſon for your Account?

A. He to whom I remit the Bill, M. A. Debtor to Caſh; but if I ſend the Bill to any Body for another Man's Account, he for whoſe Account I remit the ſaid Bill, his Account Debtor to Caſh.

Q. When you negociate or ſell Bills which you have kept for your own Account?

A. Caſh Debtor to Account of Exchange.

OF REMITTING.

Q. When any Body remits you for your Account?

A. Caſh Debtor to him that remits me M. A. and if it is for H. A. then Caſh is Debtor to him that remits me H. A. and if it is for another Man's Account, then Caſh is Debtor to him for whoſe Account it is remitted H. A.

Q. When any Body remits another for your Account?

A. He to whom the Bill is remitted, M. A. Debtor to him that remitted the Bill, M. A.

Q. When any Body remits you for your Account, and that the Bill is payable in another Town or Country, and that you ſend the Bill to your Friend there to receive it for you?

A. If I ſend the Bill for my Account, he to whom I ſend it, M. A. Debtor to him that remitted the Bill, M. A.

Q. When you remit any Body a Bill for your Account, and that the Bill comes back proteſted, and that he that gave you the Bill returns you the Money?

A. Caſh Debtor to ſundry Accounts, *viz.*

To him to whom the Bill was remitted, M. A.

To Profit and Loſs for the Re-exchange.

Q. When you have remitted to any Body for his Account, and that the Bill comes back proteſted, and that you are re-imburſed for the Bill and Charges?

A. Caſh Debtor to him to whom I had remitted the Bill, H. A.

OF INSURANCE,

Inſuring, is to be reſponſible for a certain Sum of Money, which one has inſured upon Effects or Goods which another has ſent abroad, or otherwiſe, and to pay ſaid Sum, in Caſe the Ship, in which the Goods were laden, happened to be taken by an Enemy, or caſt away; as per Example, ſuppoſe I had ſent ſome Goods to Sea, and had no Mind to run the Riſque of their being either taken or loſt, then I agree with ſome Perſon to inſure me a certain Sum of Money on the ſaid Goods, paying him, 4, 5, or 6, &*c.* per Cent. more or leſs, according as the Voyage is dangerous or long, which Sum is called the Præmium; which I pay to him that inſures me, as ſoon as he has ſigned me an Inſtrument or Paper, which is called a Policy, by which the ſaid Inſurer is liable to all Accidents, or Damages, which may befall ſaid Goods during the Voyage, but if the Goods arrive ſafe, the Præmium remains in the Hands of the inſurer; and in Caſe the ſaid Goods happened to be loſt or taken by the Enemy, then the ſaid Inſurer is obliged to pay me the Sum which he had inſured me.

Q. When you get Goods inſured for your Account and pay the Præmium?

A. The Goods or Voyage Debtor to Caſh for the Præmium, Policy, &*c.*

Q. When the Goods that were inſured are loſt, and that the Inſurer pays you the Inſurance Money?

A. Caſh Debtor to Voyage, or to the Goods that were inſured.

Q. When you inſure to another, and that you receive the Præmium?

A: Caſh Debtor to Account of Inſurance.

Q. When the Goods inſured are caſt away or taken by the Enemy, and that you pay the Money inſured?

A: Account of Inſurance Debtor to Caſh.

Q: When your Correſpondent gets Inſurance made for your Account?

A: The Voyage or Goods Debtor to him that got the Inſurance made for me, M. A.

Q. When the Goods which your Correſpondent had inſured miſcarry. and that he receives the Money that was inſured then?

A. The ſaid Correſpondent, M. A. Debtor to Voyage or Goods inſured.

Q. When you get Inſurance made for another Man's Account?

A. He for whoſe Account I get inſurance made, H. A. Debtor to ſundry Accounts, *viz.*

To Caſh for the Præmium, — — £.
To Charges for the Policy, *&c.* at half per Cent. — — — £.
To Profit and Loſs for my Commiſſion, at two and a half per Cent. £.

Q. When the Ship or Goods which you got inſured for another Man's Account, happen to be loſt, and that you receive the Money which was inſured on them?

A. Caſh Debtor for him to whoſe Account the Goods were inſured, H. A.

Of BOTTOMRY.

Bottomry is when a Maſter of a Ship borrows Money on the Bottom or Keel of a Ship, ſo as to forfeit the Ship itſelf to the Perſon who lends the Money, if it be not paid at the Time appointed after the arrival of the Ship at the Port deſigned, with the Intereſt of 30, 40, or 50 per Cent. according as it is agreed upon; but if the Ship miſcarry, the Lender loſes his Money, and therefore the Intereſt is uſually ſo great.

Q. When you lend Money on Bottomry?

A. Bottomry Account Debtor to Caſh for the Principal, and to Profit and Loſs for the Intereſt.

Q. When the Ship arrives, and your Friend adviſes you that he received both the Principal and Intereſt?

A. He who receives the Money, M. A. Debtor to Bottomry Account for principal and intereſt.

Q. When it happens that the Ship is caſt away, on which you lent the Money?

A. Profit and Loſs Debtor to Bottomry Account.

Of INTEREST.

Q. When you lend Money at Intereſt?

A. He to whom I lend the Money, H. A. of Intereſt Debtor to Caſh.

Q. When you receive the Intereſt?

A. Caſh Debtor to Profit and Loſs.

Q. When you receive both Principal and Intereſt?

A. Caſh Debtor to ſundry Accounts, *viz.*
To ſuch a Perſon his Account of Intereſt for the Principal, to Profit and Loſs for the Intereſt.

Q. When you borrow Money at Intereſt?

A. Caſh Debtor to him that lends the Money, H. A. of Intereſt.

Q. When you pay Intereſt?

A. Profit and Loſs Debtor to Caſh.

Q. When you pay Intereſt and Principal?

A. Sundry Accounts Debtor to Caſh, *viz.*
He from whom I had the Money, to H. A. of Intereſt for the Principal, and Profit and Loſs for the Intereſt.

Of MORTGAGE.

To receive or give Money at Mortgage differs nothing from Money lent at Intereſt, but in this only, that for the Security of your Money you have Houſes or Lands made over to you.

The Books in general uſed by Merchants are as follow, *viz.*

1. A Memorial or Waſte Book,	Principal Books.
2. A Journal,	
3. A Ledger,	
4. A Caſh Book,	Inferior Books.
5. A Factor Book,	
6. A Charges Book,	

The number of Inferior Books cannot be leſſened, but may be augmented.

Of the MEMORIAL and JOURNAL.

In the Memorial are written all the Affairs in general, with their Circumſtances one after another, at the Time when they happen, which muſt be obſerved as exact as poſſible; for in Caſe of Diſputes and Differences, they often refer to this Book as being the Original of all other

Books. In the Journal are inſerted all the Articles which are in the Memorial, with their Difference, as in the following Examples, *viz.*

[A Memorial Article.]

Cork, 1ſt *January*, 1792.

Sold to *Peter Clarke*, of this Town, 20 Hhds. of Tobacco, Weight 9465*lb.* at 9*d.* per Pound payble 2d *July* next, —— —— £. 354 18*s.* 9*d.*

[A Journal Article.]

Cork, 1ſt *January*, 1792.

Peter Clarke, Debtor to Tobacco, £. 354 18*s.* 9*d.* For 20 Hhds. ſold him at 9*d.* per Pound, payable 2d *July* next, —— —— £. 354 18*s.* 9*d.*

Now to poſt or bring the above Journal Article into the Ledger; firſt, you may in the Margin draw a Stroke thus $\frac{9}{7}$, above which is put a Figure, ſhewing the Folio of the Ledger, where *Peter Clarke*, has H. A. which is here Folio 9, and underneath is put the 7, ſhewing where Tobacco Account is in your Ledger, and when you have poſted it, that is, having made *Peter Clarke* Debtor in the Ledger, and given Tobacco Credit, put a Mark or Punct thus (✓) before each Figure, which ſignifies that the Article is entered or poſted in the Ledger.

Of the LEDGER.

The Debtor Side of the Account of Stock, ſhews what you are indebted, and the Credit Side ſhews what is owing to you, and the Difference between them is what you are really worth, the Debtor Side of Account of Caſh, ſhews what Money you have received; the Credit Side ſhews what Money you have paid, and the Difference is what you have in Caſh.

All that is in the Debtor Side of the Account of Perſons, is what they are indebted to you ; and all that is in the Credit Side is what you are anſwerable for to them ; the Debtor Side of the Account of Merchandizes, ſhews what Quantity you have bought, and what they coſt ; and the Credit Side ſhews how you have diſpoſed of them and their Produce.

In the Debtor Side of Profit and Loſs, ſtands all you loſe ; and in the Credit Side ſtands all you have gained. In general, all that is in the Debtor Side of the Ledger, except the Account of Stock, Profit and Loſs, and ſuch like, is what is due to you, or what you may call your own ; and all that is in the Credit Side, is what you owe to others, or what you are anſwerable to them for.

Of the CASH BOOK.

The Caſh Book is alſo kept by Debtor and Creditor ; on the Debtor Side put all the Money you have received, from whom or for what, and on whoſe Account and in what Species ; in the Credit Side you put all the Money paid, to whom, for what, for whoſe Account, and in what Species.

Of the FACTOR BOOK.

In the Factor Book are copied all the Invoices an Account of Sales whatſoever.

Of the CHARGES BOOK,

The Charges Book ſerves only for the Entry of all Manner of Charges which are duly paid, as Porterage, Labourers, Boat Hire, Cellarage, *&c.* the total Sum of which at the End of every Month, is put down in the Memorial in one Article.

Of

Of the BALANCE.

When your Books are poſted, pointed, and examined, you muſt add up all the Accounts in the Ledger; that is, ſum up all the Debtor Sides, and the Credit Sides, and if the Totals do agree, then your Books do balance; or thus, take the Difference of all the Accounts, whatever the Debtor exceeds the Creditor, and put them under one another; and alſo whatever the Credit Side exceeds the Debtor, and put them alſo under one another, and if their Totals are alike, your Books do balance.

Of PROFIT and LOSS.

The Accounts by which you can be a Gainer or a Loſer, are, *viz.* Accounts of Merchandizes, Voyages, or Goods ſent abroad, Account of Exchange, or ſuch Account of Perſons where the foreign Money is kept within the Lines. Now to know what you have gained or loſt by any Account of Merchandizes, add up in the Debtor Side the Quantity of Caſks, Bales, Weights, or Meaſures, which you have bought; do the ſame in the Credit Side with what you have ſold, and if you find as many Bales, Caſks, Weights or Meaſures, &c. in the Credit Side, as in the Debtor Side, that ſhews that the Goods you have bought are ſold or otherwiſe diſpoſed of; if the Money in the Credit Side exceeds that of the Debtor, that is what you have gained by the ſaid Goods, but if the Money in the Debtor exceeds that of the Creditor, the Difference is what you have loſt by them. The ſame is to be obſerved in all Accounts of Voyages, Account of Inſurance, Account of Exchange, or any Account whereby you may be either Gainer or Loſer.

If any Man's Account which is called My Account, balances in the foreign Money, that is the Money that is kept within-ſide of the Country Money where you live, then you owe nothing to him, nor he to you; but if the Debtor of the outſide Money, that is, the Money of the Country where you are, exceeds the Creditor, ſo much is loſt by the Difference of Exchange; and if the Creditor exceeds the Debtor, ſo much is got by it.

Having thus examined the ſeveral Accounts, and noted their Profits and Loſſes on a piece of Paper, then write in your Journal thus: Profit and Loſs Debtor to ſundry Accounts, that is, to every one of thoſe Accounts in particular, for as much as you have loſt by them, and make ſundry Accounts, that is, every one of thoſe Accounts you have got Profit by, Debtor to Profit and Loſs.

All thoſe Accounts being poſted and cloſed in the Ledger, you muſt add up your Account of Profit and Loſs in the Ledger, and whatſoever the Creditor exceeds the Debtor is clear Profit, or what your ſtock is increaſed, for which Sum you muſt make Profit and Loſs Debtor to Stock: but if the Debtor exceeds the Creditor, that is what you have loſt, and your Stock is ſo much diminiſhed, for which Sum you muſt make Stock Debtor to Profit and Loſs.

ADVICE to a Young MERCHANT.

Whatſoever you take in Hand, or do, be ſure you deal juſtly by all Men, for ill gotten Goods ſeldom proſper long. Be not too haſty to be over rich, for that oftentimes brings one to Poverty. Be not too greedy of falling into much buſineſs, for great Merchandizes make a man either Rich or Poor ſoon. Rob not the King of his Cuſtoms, for many times a Pound that way gotten coſts ten. Trade not in deceitful, unmerchantable, falſe Wares. Keep juſt Weights, equal Balance, and lawful Meaſures. Take good Notice of all you receive in and pay out in the Way of your Trade. Keep your Books and Accounts exact and in good Order, for therein conſiſteth the Credit of a Merchant. Be often peruſing your Books, to acquaint yourſelf with your Eſtate, for many through Neglect in that, have not only been undone, but greatly diſgraced. Adventure no more at any time than, that if you loſe you can bear; make your Adventure in many Parcels, that if one fails the others perhaps may help up the Loſs. Take heed with whom you deal, and whom you truſt; thruſt no Man till you have tried him firſt. Seek not, without great neceſſity, to be credited by other, for the more you trade on your Stock, the leſs care and more Honour you have. Be not lightly Security for others, for many thereby ſuffer damages; neither lightly deſire any to be Security for you, for one good Turn requires another. What you have once promiſed, be careful to perform, for Merchants may ſuffer by not keeping their Words.—— Therefore, when you have payments to make, provide in Time, and have the Sum and Days in continual Remembrance. Be as careful as poſſible not to trade above your Stock.

Leave not your Buſineſs too much to another, but have a continual Overſight of it yourſelf. Live not in Faſhion, either above or inferior to your Rank, but keep in a Middle Way. Love more your Reputation than your Riches; when you have gained, praiſe God, and Remember the Poor. Be not prodigal, for that is waſting, not yet niggardly, for that is baſe. Keep ſtill a noble generous Mind, guided by a good underſtanding. Have a certain ordinary Time of being at home, and miſs no Man, if it be poſſible, at the time appointed. Frequent the Exchange and other meeting Places of Merchants, for Abſence makes a Man ſometimes ſuſpected. If you deal for others, do for them as for yourſelf, you thereby gain Friends, and Reputation. Be ſure you follow the Orders you receive from your Correſpondents punctually. Settle often with thoſe you deal with, for ſhort Accounts make long Friends. Let your Letters be conciſe and to the Purpoſe, free from quaint and ſtudied Expreſſions; there ought to be nothing obſcure or ſuperfluous in them, or any affected Abbreviations, for all Orders and Circumſtances of Trade are plainly to be delivered. Tell your Correſpondent in plain Terms what you would have done for you, and what you are to do or have done for him.

The DIGNITY of TRADE in *Great Britain*, and *Ireland*: Extracted from the MERCANTILE LIBRARY, or COMPLETE ENGLISH TRADESMAN.

IS not Trade the inexhauſtible Fund of all Funds, and upon which the Reſt depend? Trade is the readieſt Way for Men to raiſe their Fortunes and Families; and therefore it is a Field for Men of Figure and good Families to enter upon.

By Trade we muſt be underſtood to include Navigation, and Foreign Diſcoveries, becauſe they are generally ſpeaking, all promoted and carried on by Trade, and even by Tradeſmen, as well as Merchants; and the Tradeſmen, as Owners, are at this Time as much concerned in Shipping as the Merchants, only the latter may be ſaid to be the Chief Employers of the Shipping.

Having thus done a particular Piece of Juſtice to ourſelves, in the Value we put upon Trade and Tradeſmen in *England*, it reflects very much upon the Underſtanding of thoſe refined Heads, who pretend to depreciate that Part of the Nation, which is ſo infinitely ſuperior in wealth to the Families who call themſelves Gentry, and ſo infinitely more numerous.

As is the Trade, ſo in Proportion are the Tradeſmen; and how wealthy are Tradeſmen in almoſt all the ſeveral parts of *England*, as well as in *London*? How common is it to ſee a Tradeſman go off the Stage, even but from mere Shop-keeping, with from ten to forty thouſand Pounds Eſtate, to divide among his Family? when, on the contrary, take the Gentry in *England*, from one End to the other, except a few here and there, what with exceſſive high living, which is of late grown ſo much into a Diſeaſe, and the other ordinary Circumſtances of Families, we find few Families of the lower Gentry, that is to ſay, from ſix or ſeven hundred a Year, downwards, but what are in Debt, and in neceſſitous Circumſtances, and a great many of greater Eſtates alſo.

On the other Hand, let any one who is acquainted with *England*, look but abroad into the ſeveral Counties, eſpecially near *London*, or within fifty Miles of it, how are the ancient Families worn out by Time, and family Miſfortunes, and the Eſtates poſſeſſed by a new Race of Tradeſmen, grown up into Families of Gentry, and eſtabliſhed by the immenſe Wealth gained, as I may ſay, behind the Counter; that is, in the Shop, the Warehouſe and the Compting-houſe!

In how ſuperior a Port or Figure (as we now call it) do our Tradeſmen live, to what the middle Gentry either do, or can ſupport? An ordinary Tradeſman now, not in the City only, but in the Country, ſhall ſpend more Money by the Year, than a Gentleman of four or five hundred Pounds a Year can do, and ſhall increaſe and lay up every Year too; whereas the Gentleman ſhall at the beſt ſtand ſtock-ſtill juſt where he began, nay, perhaps, decline; and as for the lower Gentry, from a hundred Pounds a Year to three hundred, or thereabouts, *though they are very often as proud and high in their appearance as the others*; as to them, I ſay, a *Shoemaker* in *London* ſhall keep a better Houſe, ſpend more Money, cloath his Family better, and yet grow rich too. It is evident where the Difference lies; an *Eſtate's a Pond*, but *Trade's a Spring*: the firſt, if it keeps full, and the Water wholeſome, by the ordinary Supplies and Drains from the neighbouring Grounds, 'tis well, and and 'tis all that is expected; but the other is an unexhauſted *current*, which not only fills the *Pond*, and keeps it *full*, but is continually *running over*, and fills all the *Lower Ponds* and *Places* about it.

This being the Caſe in *England*, and our Trade being ſo vaſtly great, it is no Wonder that the Tradeſmen in *England* fill the Liſt of our Nobility and Gentry; no wonder that the Gentlemen of the beſt Families marry Tradeſmens Daughters, and put their younger Sons apprentices to Tradeſmen: and how often do theſe younger Sons come to buy the elder Sons Eſtates, and reſtore the Family, when the Elder, and Head of the Houſe, proving rakiſh and extravagant, has waſted his Patrimony, and is obliged to make out the Bleſſing of *Iſrael's*

Family, where the Younger Son bought the Birthright, and the Elder was doomed to ſerve him.

Trade is ſo far here from being inconſiſtent with a Gentleman, that in ſhort, *Trade* in *England* makes Gentlemen, and has peopled this Nation with Gentlemen; for after a Generation or two, the Tradeſmens Children, or at leaſt their Grand-children, come to be as good Gentlemen, Stateſmen, Parliament-men, Privy-counſellors, Judges, Biſhops, and Noblemen, as thoſe of the higheſt Birth, and the moſt Ancient Families; as we have ſhewn. Nor do we find any Defect in either the Genius or Capacities of the Poſterity of Tradeſmen, ariſing from any Remains of Mechanic Blood, which 'tis pretended, ſhould influence them; but all the Gallantry of Spirit, Greatneſs of Soul, and all the generous Principles that can be found in any of the ancient Families whoſe Blood is the moſt untainted, as they call it, with the low Mixture of a Mechanic Race, are found in theſe; and, as is ſaid before, they generally go beyond them in Knowledge of the World, which is the beſt Education.

To bring this Home to the Ladies, who are ſcandalized at that mean Step, as the call it, of marrying a Tradeſman; it may be told them, for their Humiliation, that, however they think fit to act, ſometimes thoſe Tradeſmen come of better families than their own; and oftentimes, when they have refuſed them to their Loſs, thoſe very Tradeſmen have married Ladies of ſuperior Fortune to them, and have raiſed Families of their own; who, in one Generation, have been ſuperior to thoſe nice Ladies both in Dignity and Eſtate; and have, to their great Mortification, been ranked above them upon all public Occaſions.

The word *Tradeſmen* in *England*, does not ſound ſo harſh, as it does in other Countries; and to ſay a *Gentleman-Tradeſman*, is not ſo much Nonſenſe as ſome People would perſuade us to reckon it: and indeed the very Name of an *Engliſh* Tradeſmen, will and does already obtain in the World; and as our Soldiers, by the late War, gained the Reputation of being ſome of the beſt Troops in the World: and our Seamen are at this Day, and very juſtly too, eſteemed the beſt Sailors in the

World: ſo the *Engliſh Tradeſmen* may be allowed to rank with the beſt Gentlemen in *Europe*; and as the Prophet *Iſaiah* ſaid of the Merchants of *Tyre*, that her *Traffickers were the Honourable of the Earth.*

The Greatneſs of the *Britiſh* Nation is not owing to War and Conqueſt, to enlarging its Dominions by the Sword, or ſubjecting the People of other Countries to her Power; it is all owing to *Trade*, to the Increaſe of our Commerce at home, and extending it abroad.

It is owing to Trade, that new Diſcoveries have been made in Lands unknown, and new Settlements and Plantations made, new Colonies planted, and new Governments formed in the uninhabited Iſlands, and the uncultivated Continent of *America*; and theſe Plantings and Settlements have again enlarged and increaſed the Trade, and thereby the Wealth and Power of the Nation, by whom they were diſcovered and planted: we have not increaſed our Power, or the Number of our Subjects by ſubduing the Nations who poſſeſſed thoſe Countries, and incorporating them into our own; but have intirely planted our Colonies, and peopled the Countries with our own Subjects, Natives of this Iſland; and, excepting the Negroes which we tranſport from *Africa* to *America*, as Slaves to work in the Sugar and Tobacco Plantations, all our Colonies, as well in the Iſlands as on the Continent of *America*, were entirely peopled from *Great Britain* and *Ireland*, and chiefly the former; the Natives having either removed farther up into the Country, or by their own folly and treachery, engaging in War againſt us, been deſtroyed and cut off.

What is it but *Trade*, the Increaſe of Buſineſs at Home, and the Employment of the Poor in the Buſineſs and Manufactures of the Kingdom, by which the Poor get ſo good Wages, and live ſo well that they will not enliſt for Soldiers; and have ſo good Pay in the Merchants Service, that they will not ſerve on Board the Ships of War, unleſs they are forced to do it?

The Inland Trade of *England* is a Thing not eaſily deſcribed; it would, in a Word, take up a whole Book by itſelf: it is the Foundation of our Wealth and Greatneſs; it is the Support of all our Foreign Trade, and our Home Manufactures.

AN

APPENDIX of ALGEBRA.

ALGEBRA (or the great Art) is a Method of managing arithmetical and geometrical Computations by Letters, by Means whereof any Queſtion may be clearly ſolved, and curious Theorems deduced for ſolving all Queſtions wherein Numbers or Lines are concerned, which would be in vain to attempt either by Arithmetic or Geometry; the Subject and Deſign of the following Appendix, with my Relation to the town of *Belfaſt*, as a public Teacher of the Mathematics, naturally induced me to write this Appendix to Mr. Gough's Arithmetic (it being an excellent School book.) I have here ſubjoined the Principles of Algebra, with ſundry Examples to exerciſe the young Algebraiſt——Having made every thing ſhort and plain, that the Rules may not be burthenſome to Youth.

The Characters or Signs which are uſed in the following Appendix are in the preceding Book, except the following x^2 ſignify that x is ſquared x^3 = the Cube of x, and x^n any power of x, &c.

$\sqrt{\quad}$ = any S[illegible]are Root. $\sqrt[3]{\quad}$ = the Cube Root and

$\sqrt[n]{\quad}$ = any Root at Pleaſure.

Quantities that are not known are repreſented by x, y, z, and v, and thoſe that are known by a, b, c, d, *&c.*

ADDITION may be comprehended in one Caſe, provided the following Directions be well underſtood.

1. When Quantities are of the ſame Kind, whether they have co-efficients or not, add them together, and their Sum will be the Sum required; but if unlike, ſubtract the co-efficients (if any) and ſet down the Difference with the Sign of the greater, + or — as the Queſtion may require.

Example 1.	*Example* 2.
$x+y+z$	$3x-4y+2z$
$x+y+z$	$4z-y+7z$
$z+y+z$	$6x-9y+6z$
Sum $3x+3y+3z$	Sum $13x-13y+15z$

N. B. Where no Sign is, the Sign + is underſtood.

Exam

Example 3.

$$\begin{array}{r} x^2-4xy+5y^2 \\ 6x^2+9xy-7y^2 \\ -2x^2-3xy+8y^2 \\ \hline \text{Sum } 5x^2+2xy+5y^2 \\ \hline \end{array} \qquad \begin{array}{r} x^2+2xy+y^2 \\ x^2-2xy+y^2 \\ \hline 2x^2 \quad\quad -6y^2 \\ \hline \end{array}$$

SUBTRACTION may be performed by changing all the Terms that are to be ſubtracted — into + or + into — and then adding them together, and the Sum will be the Difference.

Exam.

$$\begin{array}{r} \text{From } 6x^2-7y+4z \\ \text{Take } 3x^2-9y+6z \\ \hline 3x^2+2y-2z \\ \hline \end{array} \qquad \begin{array}{r} 4x^3-3y^2+4z \\ 6x^3-9y^2-2z \\ \hline -2x^3+6y^2+6x \\ \hline \end{array}$$

Exam. 2.

$$\begin{array}{r} ax \\ bx \\ \hline ax-bx \\ \hline \end{array} \qquad \begin{array}{r} ax-by \\ x-z \\ \hline ax-by-x+z \\ \hline \end{array}$$

MULTIPLICATION is performed [illegible] one general rule; obſerving that like Signs prod[illegible] + and unlike — in the Product.

N. B. If the Quantities have co-efficients multiply them, if not join the Letters like the Letters of a Word, obſerving to place the Sign + or — (as above) before them.

Exam. 1.

$$\begin{array}{r} \text{Multiply } x \\ \text{by } x \\ \hline \text{Product } x^2 \\ \hline \end{array} \qquad \begin{array}{r} -x \\ y \\ \hline -xy \\ \end{array} \qquad \begin{array}{r} x^6 \\ y^8 \\ \hline x^6y \\ \hline \end{array}$$

$$\begin{array}{l} x+y+z \\ x+y+z \\ \hline x^2+xy+xz \\ \qquad xy+y^2+yz \\ \qquad\qquad xz+yz+z^2 \\ \hline x^2+2xy+y^2+2xz+2yz+z^2 \\ \hline \end{array}$$

$$\begin{array}{l}
x^3+y^3+z^3 \\
x^3+y^3+z^3 \\
\hline
x^6+x^3y^3+x^3z^3 \\
\qquad xy^3+y^6+y^3z^3 \\
\qquad\qquad x^3z^3+y^3z^3+z^6 \\
\hline
x^6+2x^3y^3+y^6+2x^3z^3+2y^3z^3+z^6 \\
\hline
\end{array}$$

N. B. The Addition of Exponents is the ſame as Multiplication of Quantities.

$$\begin{array}{lll}
\text{Multiply} & x^6+y^6 & x^n+v^n \\
\text{by} & x^6-y^6 & x^n-v^n \\
\hline
 & x^{12}+x^6y^6 & x^{2n}+x^nv^n \\
 & \quad -x^6y^6-y^{12} & \quad -x^nv^n-v^{2n} \\
\hline
 & x^{12}-y^{12} & x^{2n}-v^{2n} \\
\hline
\end{array}$$

This laſt ſhows that the Rectangle or Product of the Sum and Difference of any two Quantities, are equal to the Difference of their Squares, which is very uſeful.

Division may be performed by one general Rule, it being nothing but the Proof of Multiplication; and therefore if the Quantities in the Diviſor have like Signs to thoſe in the Dividend, the Quotient will be Affirmative; but if unlike, it will be Negative.

Exam. 1. $x)xy+x(y+1$

Exam. 2. $xy)xy^2(y$ *Exam.* 3. $x^2)x^5(x^3$

Exam. 4. $x+v)x^2+2xv+v^2(x+v$

$$\begin{array}{l}
x^2+xv \\
\hline
xv+v^2 \\
xv+v^2 \\
\hline
\end{array}$$

$x-v)$

$$\begin{array}{l}
x-v)x^4-v^4(x^3+x^2v+xv^2+v^3 \\
\quad x^4-x^3v \\
\hline
\quad +x^3v-v^4 \\
\quad\quad x^3v-x^2v^2 \\
\hline
\quad\quad +x^2v^2-v^4 \\
\quad\quad\quad x^2v^2-xv^3 \\
\hline
\quad\quad\quad +xv^3-v^4 \\
\quad\quad\quad\quad xv^3-v^4 \\
\hline
\quad\quad\quad\quad\quad\cdot\quad\cdot
\end{array}$$

$$x)-xv-xy(-v-y$$

$$\begin{array}{l}
x-y)x^2-2xy+y^2(x-y \\
\quad x^2-xy \\
\hline
\quad -xy+y^2 \\
\quad -xy+y^2 \\
\hline
\quad\quad\cdot\quad\cdot
\end{array}$$

$$\begin{array}{l}
x-v)x^5-v^5(x^4+x^3v+x^2v^2+xv^3+v^4 \\
\quad x^5-x^4v \\
\hline
\quad +x^4v-v^5 \\
\quad\quad x^4v-x^3v^2 \\
\hline
\quad\quad +x^3v^2-v^5 \\
\quad\quad\quad x^3v^2-x^2v^3 \\
\hline
\quad\quad\quad +x^2v^3-v^5 \\
\quad\quad\quad\quad x^2v^3-xv^4 \\
\hline
\quad\quad\quad\quad +xv^4-v^5 \\
\quad\quad\quad\quad\quad xv^4-v^5 \\
\hline
\quad\quad\quad\quad\quad\quad\cdot\quad\cdot
\end{array}$$

Involution of Quantities is nothing but multiplying them continually together as the Power they are to be raiſed to.

Thus; $x\times x=x^2\times x=x^3$ &c.

Sir ISAAC NEWTON has given the following Rule for raiſing any Binomial to any Power, which is this

Rule.

If the Index of the firſt Letter of any Term be multiplied into its own Co-efficient, and the Product be divided by the Number of Terms to that Place, the Quotient will be the Co-efficient of the next ſucceeding Term forward.

Required to raiſe $x+v$ to the 6th Power regularly up.

$\sqrt{\overline{x+v}}|^{2}=x^{2}+2xv+v^{2}=$ the Square
$\sqrt{\overline{x+v}}|^{3}=x^{3}+3x^{2}v+3xv^{2}+v^{3}=$ the Cube
$\sqrt{\overline{x+v}}|^{4}=x^{4}+4x^{3}v+6x^{2}v^{2}+4xv^{3}+v^{4}=$4th Power
$\sqrt{\overline{x+v}}|^{5}=x^{5}+5x^{4}v+10x^{3}v^{2}+10x^{2}v^{3}+5xv^{4}+v^{5}$
$=$5th Power
$\sqrt{\overline{x+v}}|^{6}=x^{6}6x^{5}v+15x^{4}v^{2}+20x^{3}v^{3}+10x^{2}v^{4}$
$+4xv^{5}+v^{6}=$6th Power, and ſo for as many Powers as you pleaſe.

$\sqrt{\overline{x-v}}|^{2}=x^{2}-2xv+v^{2}$
$\sqrt{\overline{x-v}}|^{3}=x^{3}-3x^{2}v+3xv^{2}-v^{3}$
$\sqrt{\overline{x-v}}|^{4}=x^{4}-4x^{3}v+6x^{2}v^{2}-4xv^{3}+v^{4}$
$\sqrt{\overline{x-v}}|^{5}=x^{5}-5x^{4}v+10x^{3}v^{2}-10x^{3}v^{3}+5xv^{4}-v^{5}$
$\sqrt{\overline{x-v}}|^{6}=x^{6}-6x^{5}v+15x^{4}v^{2}-20x^{3}v^{3}+15x^{2}v^{4}-$
$6xv^{5}+v^{6}$.

Note. All even Terms end with $+$ and thoſe that are odd with $-$

Evolution, or the Extraction of Roots, being the reverſe of Involutions or raiſing of Powers, is performed by converſe Operations (*viz.*) by the Diviſion of Indices, as Involution was by their Multiplication——Thus the Square Root of x^{6}, $=x^{\frac{6}{2}}=x^{3}$ and $x^{5}=x^{\frac{5}{2}}=\sqrt[2]{x^{5}}|$ and univerſally $x^{n}=x^{n}=\sqrt[2]{x^{n}}|$—Required the Square Root of $x-a^{2}$ it will be $\sqrt{\overline{x-a}}\,|\,\frac{1}{2}$.

If the Cube Root of any Quantity were to be extracted, put the Radical Sign over the Quantity, with the Index 3 above the Radicals thus; the Cube Root of ax, will be $\sqrt[3]{ax}|$ of $x^{12}=x^{\frac{12}{3}}=x^{4}$ and $x^{n}=\frac{n}{3}$, &c.

Required the Cube Root of $x^{3}-3x^{2}y+3xy^{2}-y^{3}$
$\sqrt[3]{x^{3}-3x^{2}y+3xy^{2}-y^{3}}|=x-y$.

See the Work.

$$\begin{array}{l}
x^3-3x^2y+3xy^2-y^3(x-y \\
x^3 \\
\hline
3x^2)\ -3x^2y+3xy^2-y^3 \\
\hline
\quad -3x^2y- \\
\qquad\quad +3xy^2- \\
\qquad\qquad\qquad -y^3 \\
\hline
\quad -3x^2y+3xy^2-y^3 \\
\hline
\end{array}$$

N. B. As Surd Quantities are not eaſily managed without the help of a Maſter, I thought it beſt to omit them.

Of Equations.

An Equation is when two equal Quantities, differently expreſſed, are compared together, by Means of the Sign $=$ placed between them.

Thus, $9-4=5$ is an Equation, expreſſing the Equality of the Quantities $9-4$ and 5.

Alſo $x=n+m$ is an Equation, ſhewing that x is equal to the Sum of the Quantities n and m.

Equations are the Means whereby we come at ſuch Concluſions as to anſwer the Conditions of any Problem that may be propoſed; and this is called Reduction of Equations.

Reduction of Equations

Has ſundry Rules, according as the Problem is propoſed; therefore when a Problem is propoſed, having but one unknown Quantity, it is called a ſingle Equation; tho' before the Quantity can be cleared we muſt examine it whether it requires Addition, Subtraction, Multiplication, or Diviſion, &c. And then having cleared the unknown Quantity, and brought it to one Side of the Equation, and all the known Quantities to the other, the Problem will be done by ſome of the above Rules.

Here follow a few Examples to illuſtrate the Rule. *Note*, Any Quantity may be tranſpoſed to either Side of the Equation, by changing its Sign. Thus $x+6=14 \therefore x-14-6=8$ .... And if $x-9=3 \therefore x=12$. Let $5x-9=4x+8$. Then it is plain $5x$ muſt be $=4x+17$, and by taking $4x$ out of both Sides of the Equation we have $x=17$.

Reduction where two or more unknown Quantities are concerned; find the Value of any of them, and then compare them together, remembering to get as many Values of each unknown Quantity as you have Equations, otherwiſe it will be in vain to attempt the Solution of any

Problem by any Learner—Here follow a few Examples that will illuſtrate the whole.

Let	1	$5x+8y=124$
	2	$3x-2y=20$
2×4		$12x-8y=80$
1×3	3	$17x=204$
$4\div17$	4	$x=\frac{204}{17}=12$
2×5	5	
1×3	6	$5x-10y=100$
$7-6$	7	$15x+24y=372$
	8	$34y=272$
$8\div34$	9	$y=8$

Note. When you multiply any Equation by an abſolute Number, you muſt daſh the Figure, as in Step the 3d, 4th, 7th, &c. to ſhew that they are not Steps multiplied together.

Given $\begin{cases}5x-3v=90\\2x+5v=160\end{cases}$

Now in order to exterminate x, let the firſt Equation be multiplied by 2, and the ſecond by 5, to make the Co-efficients of x alike, there will ariſe the two following Equations, $10x-6v=180$

$10x-+25v=800$

the firſt of which ſubtracted from the ſecond, we have $31v=620$, which Difference being divided by 31 the Co-efficient of v, gives $v=20$, then by tranſpoſing $6v$ in the firſt Equation, we have $10x=180+6v$ or $10x=180+120 \therefore x=30$.

Let	1	$x+y=13=a$
	2	$x+z=14=b$
	3	$y+z=15=d$
$1+3+3$	4	$2x+y+2z=42=a+b+d$
$4\div2$	5	$x+y+z=21=\frac{a+b+d}{2}$
$5-3$	6	$x=\frac{a+b+d}{2}-d=6$
$5-2$	7	$y=\frac{a+b+d}{2}-b=7$
$1-5$	8	$x=\frac{a+b+d}{2}-a=8$

REDUCTION of EQUATIONS.

If the Quantities of the Equation be fractional, make them on each ſide pure Fractions, then multiply them croſs-wiſe, and the product may be reduced as before.

Example $\frac{x}{4}=\frac{a}{3}$ then $x\times 3=a\times 4 \therefore 3x=4a$, hence $x=\frac{4a}{3}$

Exam. 2. $\frac{x}{4}=\frac{16}{x} \therefore x^2=64$ by extracting the Square Root on both ſides of the Equation, we have $x=8$.

Exam. 3. $\frac{x-b}{a}=\frac{b-x}{n}$, which Equation being multiplied croſs-wiſe, we have $nx-nb=ab-ax$, and by Tranſpoſition and Diviſion we have $x=\frac{ab+nb}{n+a}$

When any Equation has a Radical Sign on one Side, the other Side muſt be raiſed to the ſame Dimenſion.

Exam. 1. Let $\sqrt{ax}=b$; then by ſquaring b we take off the Radical, and we have $ax=b^2$. Now in order to find x we muſt divide both Sides of the Equation by $a \therefore x=\frac{b^2}{a}$, and ſo for any other.

When a Problem hath two Dimenſions, it cannot be anſwered by any of the Methods before laid down; and therefore we muſt have Recourſe to ſome other Method; which is by completing the Square, and is performed by the following

Rule.

Add the Square of half the Co-efficient of the unknown Quantity to both Sides of the Equation, and the Square will be complete.

Given $x^2+2ax=b$ Required x.

Firſt let a be ſquared and added as above; we have $x^2+2ax+a^2=a^2+b$. Then by extracting the Root on both Sides of the Equation, we have $x+a=\sqrt{a^2+b}$ and by tranſpoſing a we have $x=\sqrt{a^2+b}-a$.

Of

Of PROBLEMS.

1. Problems are Queſtions to be ſolved.

2. The Solution of a Problem is, the Anſwer to a Queſtion, or the Determination of the Quantity ſought.

3. The Problem has oftentimes various Anſwers, and therefore it is neceſſary to know when it is truly limited; which may be known by the following

Rule.

When the Number of Quantities ſought, exceeds the Number of Equations given, the Queſtion admits of various Anſwers.

Suppoſe $x+y=20$, now it is plain, x may be any Number, whole or broken, being leſs than 20, and y the Remainder.

Rule.

When the Number of Quantities ſought are equal to the Number of Equations (not depending on each other) the Queſtion is truly limited.

Axioms for the more ready ſolving Queſtions.

Ax. 1. If from the Sum of any two Quantities either Quantity be taken, the Remainder is the other Quantity.

Ax. 2. The Difference of any two Quantities being added to the leſs, the Sum is the greater.

Ax. 3. The Product of any two Quantities being divided by either Quantity the Quotient is the other.

Ax. 4. The Quotient of any two Quantities being multiplied by the leſs, the Product is the greater.

Ax. 5. The Rectangle of the Sum, and difference of any two Quantities, is equal to the Difference of their Squares.

Ax. 6. The Difference of the Squares of the Sum, and Difference of any two Quantities, is equal four Times their Rectangle.

Ax. 7. The Sum of the Squares of the Sum, and Difference of any two Quantities is equal twice the Sum of their Squares.

$x+y=$Sum,
$x-y=$Difference
$xy=$Product
$\frac{x}{y}=$Quotient.
$x^2+y^2=$Sum of the Squares.
$x^2-y^2=$Difference of the Squares.

Note. The above being underſtood, any Problem may be eaſily taken into the Algebraic Method.

SOLUTION of PROBLEMS.

Prob. 1. The Sum of two Numbers being 14, and their Difference 5; Required the Number with a Theorem for all ſuch Queſtions?

Let $14=a$, $5=b$ and $x=$leſs than
$b+x$ will be the greater Number *per* Ax. 2,
1 $2x+b=a$ *P. Q*
1 $-\div$ 2 $x=\frac{a-b}{2}=5$
$b+x=9$

N. B. I ſhall follow the above Numbers for 10 Queſtions.

Prob. 2. The Sum of two Numbers $=a$ and their Product. p
Required the Numbers?
$x=\frac{1}{2}$ Differ. of the Numbers $a+x=$greater
$-$ $a-x=$leſs.
$+$ 1 $a^2-x^2=p$
$-$ 2 $a^2-p=x^2$
2 $\sqrt{}$ 3 $x=\sqrt{a^2-p}=2 \therefore a+x=9$, $a-x=5$.

Prob. 3. The Sum of two Numbers 14 *(a)* and their Quotient 1, 8 *(q)* required the Numbers.
$x=$leſs & $qx=$greater Number.
1 $x+qx=a$ *P. Q*
1 $\div$ 2 $x=\frac{a}{q+1}=5$
$qx=9$

Prob. 4. The Sum of any two Numbers being 14, and the Sum of their Squares 106, required the Numbers?

14=

$14=2a$, $x=\frac{1}{2}$ Difference, $106=b$
$a+x=$greater & $a-x=$leſs Number
1 | $2a^2+2x^2=b$
1 − ÷ | 2 | $2x^2=\frac{b-2a^2}{2}$
2 √ | 3 | $x=\frac{\sqrt{b-2a^2}}{2}=2$
$a+x=9$
$a-x=5$

Prob. 5. The Sum of two Numbers 14, and the Difference of their Squares 56, required the Numbers?

$x=\frac{1}{2}$Differ. of the Numbers, $14=2a$; $56=b$
$a+x=$greater $a-x$ leſs.
1 | $4\ a=b$
1 ÷ | 2 | $x=\frac{b}{4a}=2$
$a+x=9$; $a-x=5$

Prob. 6. The Difference of two Numbers 4, and their Product 45, required the Numbers;

$x=\frac{1}{2}$ Sum $4=2a$, $45=b$
$x+a=$greater, $x-a=$leſs.
1 | $x^2-a^2=b$
1 + √ | 2 | $x=\sqrt{b+a^2}=2$
$x+a=9$
$x-a=5$

Prob. 7. The difference of 2 Numbers being 4, and their Quotient 1, 8 required the Numbers?

$x=$leſs, 1, $8=q$, $4=b$
$qx=$greater
1 | $qx-x=b$
1 ÷ | 2 | $x=\frac{b}{q-1}=5$
$qx=9$

Prob. 8. The difference of two Numbers 4, and the Sum of their Squares 106, required the Numbers?

$x=\frac{1}{2}$ Sum $4=2a$, $106=b$:

$x+a=$ greater $x-a=$ leſs

1 $2x^2+2a^2=b$

1 — ÷ √ 2 $x=\frac{\sqrt{b-2a^2}}{2}=2$

$x+a=9$; $x-a=5$

Prob. 9. The Sum of two Numbers 14, and the Difference of their Squares 56, required the Numbers?

$14=2a$, $56=b$, $x=\frac{1}{2}$ Difference.

$a+x=$ greater $a-x=$ leſs

1 $4ax=b$

1 ÷ 2 $x=\frac{b}{4a}=2$

$a+x=9$

$a-x=5$

Prob. 10. The Product of two Numbers being 45, and their Quotient 1, 8 required the Numbers?

$45=b$ $1,8=q$

$x=$ leſs, $qx=$ greater.

1 $qx^2=b$

1 ÷ √ 2 $x=\frac{\sqrt{b}}{q}=5$

$qx=9$

Prob. 11. What two Numbers are thoſe whoſe Sum is 40, and Product only 4, with a Theorem for all ſuch Queſtions?

Let $40=2a$, $x=\frac{1}{2}$ Difference of the Numbers.

then $a+x=$ greater and $a-x$ leſs Number.

1 × 1 $a^2-x^2=4=b$

√ 2 $a^2-b=x^2$

$x=\sqrt{a^2-b}=19\ 899$

3 $a+x=39,\ 899$

$a-x=0,\ 100$

Prob. 12. Required two Numbers whoſe Product is 12, and the Difference of their Squares 7?

$\sqrt{x}=$

		$\sqrt{x}=$greater, $\sqrt{y}=$leſs Number.
	1	$\sqrt{xy}=12$
	2	$x-y=7$
1 + ²	3	$xy=144$
2 + y	4	$xy-y^2=7y$
3 − 4	5	$x^2=144-7y$
5 + $7y$	6	$y^2+7y^2=144$
6 □	7	$y^2+7y+\frac{49}{4}=144+\frac{49}{4}$
7 √	8	$y+\frac{7}{2}=\sqrt{144+\frac{4y}{4}}$
8 − $\frac{7}{2}$	9	$y=9 \therefore \sqrt{y}=3$ & $\sqrt{x}=4$

Prob. 13. A Gentleman being aſked how many Guineas he had in his Pocket? anſwered, if the Number I have be multiplied by 4, and the Square Root of the Product be added to the Number of Guineas I have in my Pocket, that Sum will be equal 440, required the Number?

		$x^2=$the Guinea he had then.
1 □	1	$x^2+2x440$ P. Q.
2 √	2	$x^2+2x+1=441$
—	3	$x+1=21$
1	4	$x=20=\therefore x^2 400$

Prob. 14. What Number is that which being divided into 4 or 5 equal Parts, the Product of all the Parts in both Caſes ſhall be exactly the ſame?

		$x=$the Number then.
	1	$\frac{x}{4}\times\frac{x}{4}\times\frac{x}{4}\times\frac{x}{4}=\frac{x}{5}+\frac{x}{5}+\frac{x}{5}+\frac{x}{5}\times\frac{x}{5}$ P. Q.
∴	2	$\frac{x^2}{3125}=\frac{x^4}{256}$
2 × ÷	3	$x=\frac{3125}{256}=12\frac{53}{256}$

Prob. 15. A Merchant ſhips Goods for Jamaica, to the Amount of £. 500; pays for Inſurance 5 per Cent. for prompt Payment 3 per Cent. how much Money ought the Merchant to inſure, ſuppoſing the Goods to be loſt, that he ſhall be no Loſer?

x = the Sum to be inſured then:

1 $x-\frac{8x}{100}=500$

$x+$ 2 $100x-8x=50000$

1 ÷ 3 $x=\frac{50000}{92}=$ £. $543 \cdot 9 \cdot 6\frac{1}{4}$, $\frac{1}{23}$

Prob. 16. You that are ſkill'd in mathematic Arts,
Divide 100 into two ſuch Parts,
That when thoſe Parts each other hath divided,
Their Quotient make juſt 5, if right decided.

$x=\frac{1}{2}$ Diff. of the Numbers, $100=2a$; $b=5$,
$a+x$ = greater & $a-x$ = leſs Number.

$\frac{a+x}{a-x}+\frac{a-x}{a+x}=b$ *P. Q.* which red^d.

Gives 2 $x=\sqrt{\frac{ba^2-2a^2}{b+2}}=32,7326$ hence.

$82,7326$ & $17,2674$ are the Parts.

Prob. 17, x ſhews the Years; and y the Months explain;
Hence by a quadratic, you my Age may gain.

1 $x^2y+xy^2=8580=a$
2 $x^2y^3+x^3y^2=1338480=b$ } Req^d. x and y.
$xy=b \quad =156=n$

2 ÷ 1 3 $y=^{n}\ \equiv\ \frac{a}{x}$

3 ÷ 4

4 + ^{2} 5 $y^2=\frac{n^2}{x^2}$

∴ 6 $nx+\frac{n^2}{x}=a$, by Subſtitution.

6 + − 7 $nx^2-ax=n^3$

7 ÷ 8 $x^2-\frac{ax}{n}=-n$ let $-2mx=-\frac{ax}{n}$

then 9 $x^2-2mx+m^2=m^2-n$

9 √ 10 $x-m=\sqrt{m^2-n}$

10 + 11 $x=m+\sqrt{m^2-n}=52$ Years.

12 $y=\frac{n}{x}=3$ Months anſwering to March.

FINIS.

THE

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